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apc editorial



TONY SARNO

An internet developer was telling me last week that, when among non-technical people, he sometimes gets accusatory looks whenever conversation turns to the nasties of the internet. It's either because they think he's partly to blame through his building of web sites, or that, as a net tragic, he's likely to be a consumer of nasties himself. It struck a chord because it's happened to me too, and it puzzles me that this depiction of the net as the harbinger of all bad things is so entrenched. Just last week in some newspapers and television the net was variously blamed for teen suicides and the ongoing corruption of morals through pornography, not to mention the ongoing credit it receives for assisting bomb makers and paedophiles. The coverage in major national newspapers and national TV shows often seems completely out of step with the incredible enthusiasm that the general population has for the net.

And yet, the net is no different to the phone in terms of facilitating communications, whether good or bad. It spurred me to do some quick research on how the phone was received when it first appeared. And lo and behold, similar things were said about Graham Alexander Bell's innovation in the late 1800s: all kinds of fears were stirred up by various groups fearful of the technology — the phone was seen to be

responsible for turning America into an indolent society, encouraging women to spend time idly chit-chatting, taking them away from their duties to their households and husbands (and potentially encouraging lesbianism). American telephone companies actively discouraged women from spending too much time on the phone, arguing that their chit-chat was tying up precious lines. And the phone was also said to make men lazy, because it would encourage them to stay at home rather than get out and visit their friends. (And it could potentially zap them, carrying far-away lightning strikes directly into their ears.)

The analysis of the internet's dark side from some sections of the media these days is not much better. Psychologists and academics have explained the phenomenon umpteen times: that those who don't understand a technology or movement (and which their kids do) will inevitably respond with a moral panic since they don't know how to control it. All the stories about suicides and pornography that pointed the finger at the net fed this moral panic. Let's move on, by addressing instead the main issue: the lack of accountability and, in many cases, criminality, of elements of society that use the net and how we stop them — rather than demonising the network and trying to block it on the PC with Net Nanny.

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IT PUZZLES ME THAT THIS DEPICTION OF THE NET AS THE HARBINGER OF ALL BAD THINGS IS SO ENTRENCHED

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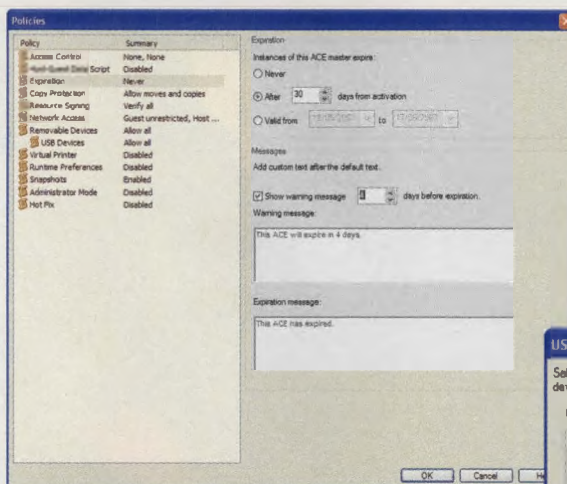
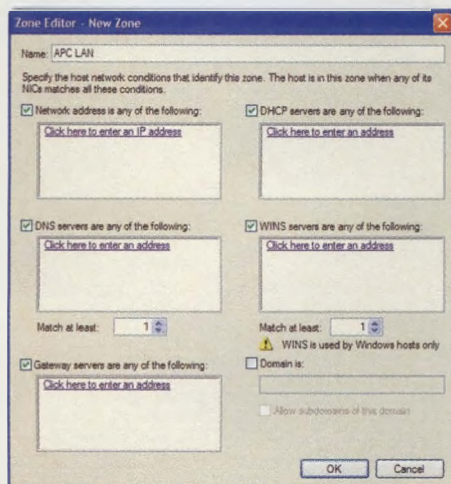


Microsoft is proud to welcome Animal Logic, one of the world's most highly respected digital production companies, as 2007 keynote speaker.

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Mission Impossible-style protection — “this desktop will self-destruct in five minutes”.

FAR LEFT: The built-in firewall gives total control over which network resources can be accessed.



Control what devices are available in your ACE desktop and block those that shouldn't be.

Now, your desktop can be virtualised

Virtualisation is no longer just about running multiple OSs — it's about to take over your desktop as well, says *Paul Schnackenburg*.

So far virtualisation for the desktop with products such as VMware Workstation, Microsoft's Virtual PC, and Parallels' Desktop for the Mac has been about running another OS on top of a host OS. VMware now wants to virtualise your desktop, and it may have a very appreciative bunch of IT administrators as its market.

With VMware's ACE 2.0 (Assured Computing Environment) the virtual machine created by IT is your main desktop. There's still an OS underneath, but its only role is to host the company-provided-and-controlled desktop.

Running automatically in VMware Player these ACE instances can be the new SOE (Standard Operating Environment) for companies with sensitive data protection needs.

IT administrators can sleep soundly at night because ACE instances can be 'wrapped' in policies. These policies control network access, data flow between

the host and virtual desktops (including blocking all data flowing from the VM to the host) and USB access.

Particular USB devices can be allowed (think mice and keyboards) whereas others can be banned (flash memory). Another compelling feature (for tempting staff for instance) are expiration policies: an ACE instance can be set to only run between certain dates, or for a set amount of time. You can also control who can activate an instance, whether the instance can be copied to another media, and which defined networks can be accessed.

This last point is interesting as the VM and host access can be controlled separately. So, the consultant's laptop OS can be denied all access to the corporate network but their ACE VM can be allowed appropriate access.

And the icing on the cake is encryption. The whole VM is by default encrypted with AES (Advanced Encryption Standard)

128-bit (ACE is currently undergoing FIPS certification).

ACE also integrates with Active Directory (through LDAP) in Windows networks. This can control password resets and use group membership to control who can use specific ACE instances.

For the truly mobile workplace there's Pocket ACE — your main desktop VM stored on a USB stick that can be plugged into any PC. Even with mobile VMs, security is controlled by policy. The VM carries its own cached policy with it but regularly attempts to contact the policy server to see if there are any updates.

The three components of the ACE solution are VMware Player (free) and VMware Workstation 6.0 for authoring ACE desktops. The last component is a management server which has a web-based interface that runs on Apache with an SQL Lite database.

ACE licensing is based on the number of users and you will of course need at least one VMware

Workstation to create the master VMs in the first place.

As with all VMware virtualisation products ACE supports both Windows and Linux as both guests and hosts. ACE handles Vista both as guest and host as well as USB 2.0 devices.

It's easy to think that ACE would only be applicable in large enterprises but VMware's Reza Malekzadeh, Director of Product Marketing & Alliances, International, says smaller business with high confidentiality requirements (think lawyers or medical research) could use ACE because of the unprecedented control provided.

Where ACE doesn't fit of course is where virtualisation in general doesn't fit: graphics-heavy environments. You wouldn't want to run a 3D CAD program inside a virtual environment. It still leaves VMware with a massive market where improving security is the constant goal of IT administrators.

Dell warms to Linux

Customer pressure or a hidden agenda — what's behind this move?

Following tens of thousands of requests, Dell has announced it intends to support Linux on its computers. Two weeks after Michael Dell ousted Kevin Rollins to return as Dell CEO, Dell launched www.ideastorm.com, a site where users can submit ideas they want to see Dell implement, and other people can vote for them.

At the time of writing, the most-requested change is that Dell ships its computers with Linux pre-installed. Clearly, Dell customers feel strongly about their open source needs and, for a change, Dell has listened and agreed to ship Linux on its desktop computers and laptops. It has chosen to ship with Ubuntu. Dell admitted it didn't have a problem choosing a distro because, as Michael Dell put it, "If we say we like Ubuntu, then people will say we picked the wrong one. If we say we like and support Ubuntu, Novell, Red Hat and Xandros, then someone would ask us, 'Why don't you support Mandriva?'"

Some cynics have speculated that Dell's Linux announcement may have more to do with Vista than Linux

— either because customers aren't willing to upgrade to Vista, or because Dell is angling for a better deal with Microsoft by using Linux as a threat. The first option seems unlikely because Dell continues to offer Windows XP to its business customers, almost certainly because Vista uptake is so slow.

The second option is equally unlikely, because Dell seems to be investing heavily in certifying its desktop and laptop hardware for the two enterprise distros (Red Hat Enterprise Linux and Suse Linux Enterprise Desktop) — a move that would be redundant if this were just a pricing ploy to catch up Microsoft.

Although Dell's shuffle towards Linux is unlikely to result in many more home PCs being sold with Linux pre-installed, its increased focus on driver support may at least mean we'll see millions more PCs able to run Linux flawlessly — even if they are pre-installed with Windows by Dell.

The second and third favourite requests are that Dell ships OpenOffice.org and Firefox.

Dell's supported Linux once before.



COOL WELCOME FOR NEW LICENCE

Linux creator happy with GPL v3 — v2 was 'insane'.

The Free Software Foundation (FSF) has announced the third draft of version three of the General Public Licence (GPL). This draft addresses some of the issues Linus Torvalds and others had pointed out, while adding new clauses to exclude future patent-shielding deals.

Torvalds had problems with the first two drafts because, in his words, "it's insane to require people to make their private signing keys available." Although draft three contains the same provision — companies may not use GPL software on devices while using a cryptographic key to stop modification — it's worded in a revised way,

specifically limiting the provision to end-user devices such as telephones and PDAs. That was enough for Torvalds, who said, "Whether it's actually a better licence than the GPL v2, I'm still a bit sceptical, but at least it's now 'I'm sceptical' rather than 'Hell, no!'"

Stopping manufacturers from locking GPL software is just one of the big changes in GPL v3. There's also the introduction of software patent clauses designed to combat licence proliferation while blocking company deals such as the recent one between Microsoft and Novell.

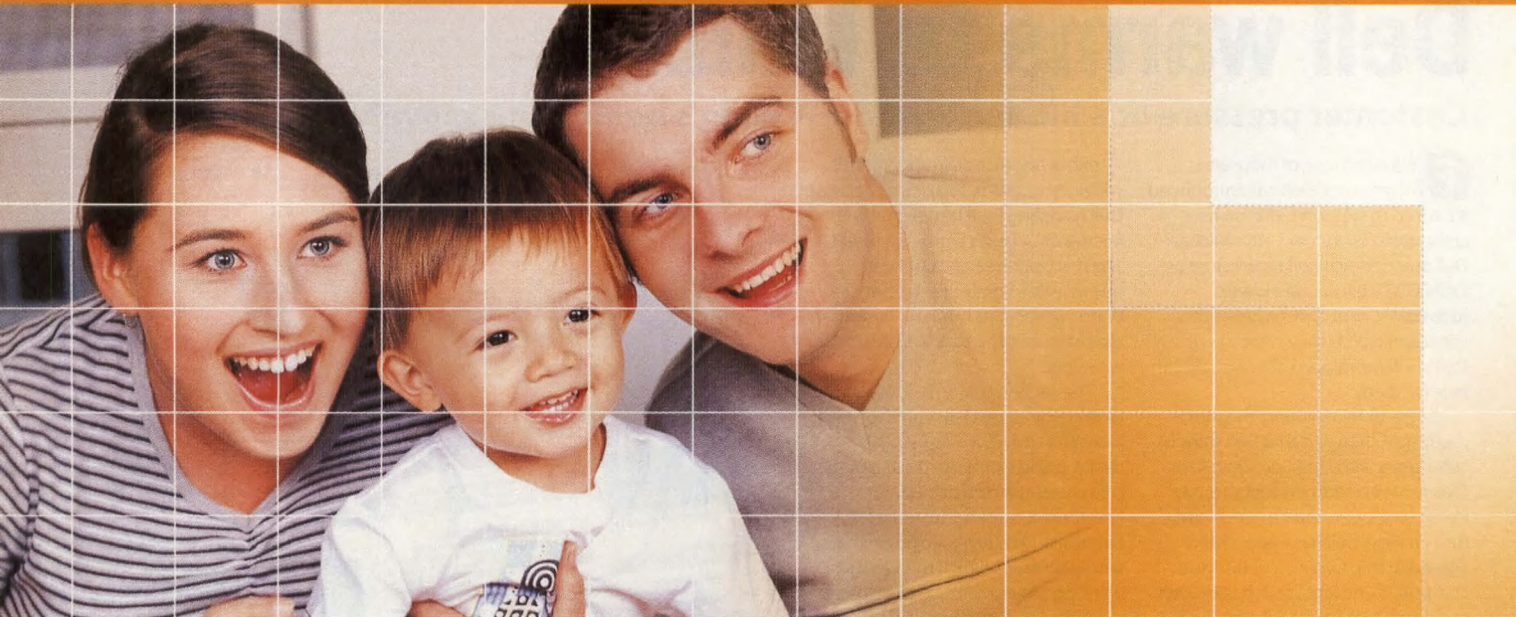
When GPL v2 was finalised in 1991, software patents were a non-issue, so the licence doesn't mention them. Since then, with GPL v2 effectively ignoring software

patents, other licences such as Apache have appeared to fill the void, stopping various free software communities from working together. While GPL v3 is unlikely to be compatible with Apache, it's a lot closer.

The FSF expects the final draft of GPL v3 to be ready in July 2007. Once it's finalised, it's almost certain the GNU software library (which comprises most Linux distros) will switch to the new licence. The Linux kernel is unlikely to make the move as it's had thousands of contributors and needs the permission of all of them to change the licence. Regardless, unless GPL v3 cuts the number of licences, most users may not notice the change.



Linus Torvalds is now happier with the draft of the GPL.



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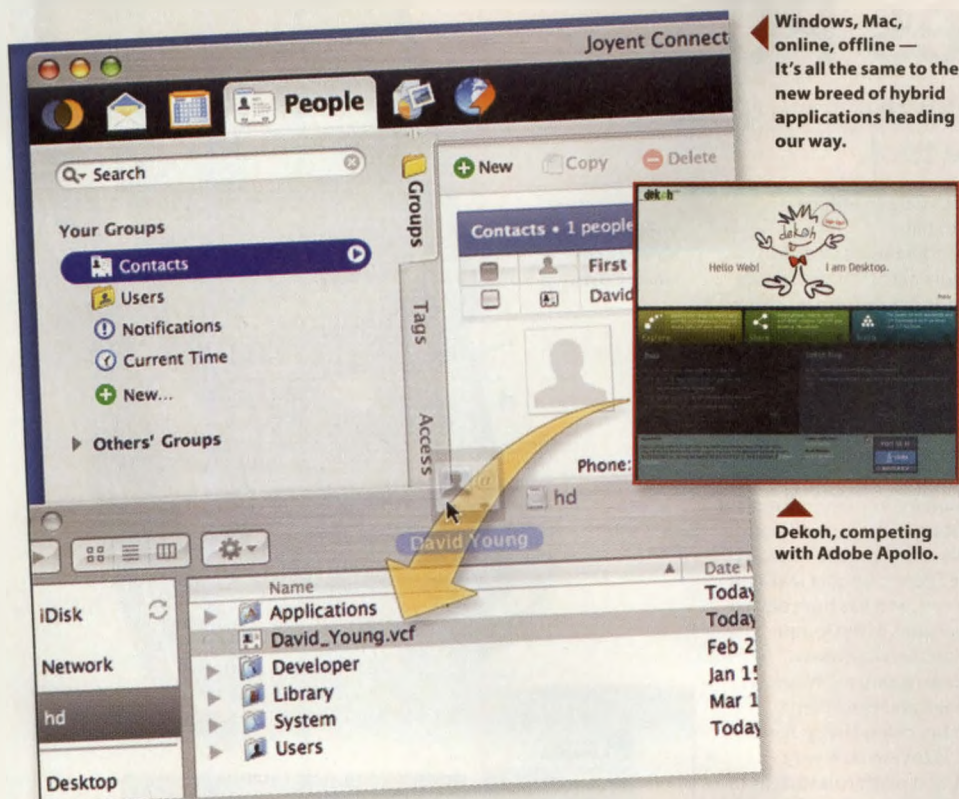
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Dekoh, competing with Adobe Apollo.

WEB 2.0 ESCAPES THE INTERNET

The latest technologies working to make offline online.

From email to Photoshop, applications are hitting the internet — but what happens when the connection goes down? In the past, it's been game over — no internet, no software, no access to your data. This won't be the case for much longer. Web apps that run straight from your desktop are the next big battleground, taking the free/subscription model we're used to online, and invading Microsoft and friends' turf.

The biggest such project is Adobe's Apollo — it's a cross-platform system capable of combining technologies like PDF, Flash, HTML and JavaScript into one universally running application, in much the same way its own Flash and

Shockwave applets now serve up everything from movies to full software. It doesn't matter if it runs on its own or is embedded into a web page; the API calls and programming methods remain the same. You could have the same mail client available from your desktop and via a web page when out roaming. Apollo can have complete access to your file system, or draw the information needed from the web. Or neither. Or both. It depends on the app.

Dekoh (www.dekoh.com) is a competing project built on the same idea, albeit with Java rather than Adobe tech, and promising results without the need to install other software. Libraries are due to be released for the common web languages, notably PHP, and a handful of

demo apps are already available. Slingshot from Joyent (www.joyent.com) offers a slightly different approach. Geared specifically to Ruby on Rails projects, it offers the ability to create an offline version of all your data and run it straight from the original code. This has raised some eyebrows, but for the most part Web 2.0 sites are built on an idea, an interface and a community, rather than priceless code snippets and custom algorithms.

This jump from web to desktop is more than a basic technical step; it's one that changes the game. And if Adobe and many others have anything to do with it, it'll be a matter of months rather than years before we see it.

THE (A)PC REVOLUTION

July 1987



OK4 WORD PROCESSOR

"OK word processor from Australian company, Pricom, is a word processor with a difference. It has all the features you could ever need — and want." Taking up a mere 62K of RAM, OK4 cost just \$612. "It can deal with files up to 60K and have up to 63 files open at once. It comes from a Sydney company called Pricom. The company is five years old and started corporate life as an NEC dealer." Ah... when PC dealers could turn into word processor developers...

ALMOST OPEN SOURCE

"Wendin, a tiny family-owned software company is challenging IBM and Microsoft with Wendin_DOS, a 'homebrew' operating system that officials claim is compatible with DOS 3.x, more capable and timely than OS/2 and cheaper than both. . . In a novel approach to software development, Wendin has tapped an unusual but powerful resource to help it in its battle with the industry giants. It is enlisting the help of hackers and hobbyists, charging them only US\$20 for beta test versions of Wendin OS."

TI'S SWANS PRINTER LAUNCH

"Everybody is getting into laser printers this year, even those of the Sydney Swanettes. . . the most notable feature of this laser is the option of the PostScript page description language." No — the most notable feature was the Swanette's uniform.





Mobile goes PC

New services and apps make the smartphone a more viable and versatile tool.

Were smartphones really smart, using the mobile web would be a much less painful experience than it currently is. Luckily, the next breed of mobile devices and applications promise to make the mobile web experience more pleasant — and thanks to changing attitudes among the big networks, keeping up with the bleeding edge shouldn't bankrupt you this time around.

One hit application could be Microsoft's Deepfish (<http://labs.live.com/deepfish>), currently in an early beta. Designed specifically for the Windows Mobile platform, which already offers BlackBerry-style push email, Deepfish addresses the problem of small-screen navigation with a clever magnification feature which allows you to zoom out to see an entire web page, before zooming right back down to the right section.

Apple's upcoming iPhone takes a similar approach, with a version of the Safari browser delivering desktop-style browsing and navigation at the touch of a finger. It also offers the ability to access the net via Wi-Fi instead of being restricted to the phone system, further saving you money when you browse at home, the office or a suitable hotspot.

However, what the two giants are promising with the iPhone and Deepfish, others are already delivering. Opera's excellent Opera Mini browser comes pre-installed on many phones and is available as a free download for most recent models at www.operamini.com. This reformats pages to make them work better on small devices and

compresses data to reduce bandwidth bills.

Microsoft believes Deepfish has a better approach. Where Opera's rendering engine reformats pages into single-column layouts, complete with a lot of scrolling, Deepfish's zoom mode keeps the site layout intact. And, of course, Apple claims its iPhone browser is "the most advanced web browser ever on a portable device".

Dark horse competitor Google is also investing in the mobile world. It currently offers mobile versions of Google Search, Google Mail and Google News, and has built device-specific versions of its Google Mobile Maps service (www.google.com/gmm) for Windows Mobile, Palm and BlackBerry.

A number of key things have changed. PDAs are now very powerful, and platforms such as the J2ME mobile Java system make it easy for developers to create applications that work on many devices. Connection speeds have improved, with most phones supporting GPRS and a growing number connecting via 3G.

Mobile computing is becoming mass-market and the potential revenues for application providers, advertisers and e-commerce are huge. PC firms are going mobile: PC sales in 2006 grew by 10% to 228.6 million units; mobile phone sales increased 22.5% from 832 million in 2005 to 1.02 billion in 2006.

Mobile computing's no longer for masochists.



Microsoft's Deepfish offers a vastly improved browsing experience with features such as zoom.



HOWEVER, WHAT MICROSOFT AND APPLE ARE PROMISING, OTHERS ARE ALREADY DELIVERING

By the numbers 675432978213

Solid-state hard disks might be more exciting than mechanical hard drives, but makers of the older technology are still raking it in. Latest figures show that global

sales of HDDs jumped from 375.8 million in 2005 to 434.2 million in 2006 — a leap of 15.5%. In the last quarter of 2006, 119.7 million drives were sold, up 15.8% on the same

period in 2005. Currently, the NAND market is depressed. Hynix and Samsung, owning 63% of the market, have cut supply due to poor margins and a glut of chips. However, there are some

suggestions of a shift, with buyers snapping up chips at bargain prices.

By comparison, HDD manufacturers will see global shipments jump by 17% in 2007.

fighting off ninjas. easy.



1. Avoid Ninjas in the first place.
Ask yourself—why have Ninjas chosen your company? Did you do something to offend a powerful warlord? Answer this question and you'll be ready for next time.

2. Use your phone (to call for help).

Ninjas are tough, and no one will judge if you call for help. Reinforcements from branch offices, even the warehouse crew, can make the difference when Ninjas attack.

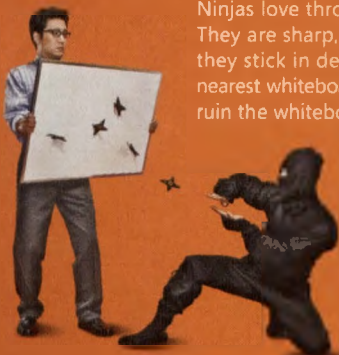
3. Use office plants as weapons.

Those dusty-looking palms around your office may look harmless, but they can make formidable weapons. Use the fronds as pokers; aim for the Ninja's sensitive spots. Cacti are useful for the Ninja-besieged enterprise. Throw them, pot and all, like grenades.



4. Use your whiteboard as a shield.

Ninjas love throwing stars, known as *shuriken*. They are sharp, and pointy, and when thrown they stick in deep and hurt a lot. Grab the nearest whiteboard and use it as a shield. Yes, it'll ruin the whiteboard, but you can explain later.



5. Find a weapon, any weapon.

Ninjas are deadly. In an office setting, however, their Ninja skills are at a disadvantage. Use what's at hand to take them by surprise. Hot coffee flung at a Ninja will get his attention. Or simply dump your rubbish bin on his head—both disabling and humiliating.



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THE IT jobs crisis

While there are still plenty of graduates looking for jobs, a shortage of experienced people is hampering some of Australia's hottest Web 2.0 companies. *Simon Sharwood and Elissa Baxter explore the ongoing skills crisis.*



Whatever your IT skill, chances are you think now might be a good time to look for a new job or ask for a raise, thanks to the shortage of skilled and experienced IT workers around Australia.

"If I talk to any vendor in Australia or any end user organisation, the number one topic is always that they can't get the right quantity of skilled people or they can't get people with the right level of skills — it's a two-part problem," says Sheryle Moon, CEO of the Australian Information Industry Association. "In November 2005, for every ICT vacancy there were about 4 suitably qualified people applying for the job," she says. "By November 2006 this figure had dropped to 2.3 suitably qualified people and in some geographical areas the figures are even worse. So in the ACT, for example, the figure is 1.3 suitably qualified applicants for every ICT vacancy, less than three people for every two jobs."

Jane Bianchini, national manager for the ICT recruitment practice at Candle, agrees that suitably experienced people are in short supply. "It is increasingly rare to find people who have a coincidence of IT skills and the behavioural competencies many organisations are looking for. Those are things like business acumen, excellent communication skills, the ability to influence thinking, quick study in a complex environment — being able to pick up new skills as well as critical thinking. It's the complete package that many organisations

"We are not seeing the sort of wages growth you'd expect to see if there was a generalised skills shortage," says Bob Kinnaird, a labour market analyst with Sydney firm RT Kinnaird & Associates. "Five per cent wages growth across the IT sector does not indicate to me that there is a generalised skills crisis."

Kinnaird, who has consulted to the federal government on the skills shortage, also believes graduate unemployment rates call into question the extent of the skills shortage.

"In April 2006, 21% of IT graduates had not found full-time work within three months of graduating. The national average was 18-19%. A year ago, IT graduate unemployment was 26%, but those rates do not indicate to me that there is a skills shortage. An industry where there is a genuine national shortage, like accounting for example, the graduate unemployment figure was 14%. There might be a skills shortage in some areas of IT, but it's not at the graduate level."

That view chimes with Bianchini's view that: "Wages have certainly increased for those people who have the whole package of technical skills, behavioural competencies as well as local experience in a particular industry vertical. Those people have seen increases of up to 20%."

Sharyn Wise, a Recruitment Consultant at Unicom Systems, also sees that the shortage is confined to certain areas.

"We are currently experiencing a shortage

IT IS INCREASINGLY RARE TO FIND PEOPLE WHO HAVE A COINCIDENCE OF IT SKILLS AND COMPETENCIES

are looking for... And the situation has been getting worse in the last 6 months."

Bianchini's opinions are validated by IT companies, who are feeling the pinch. "Our business is five years old and we currently have 100 people, 60 of them in Sydney," says Mike Cannon-Brookes, co-founder and co-CEO with enterprise software company Atlassian, one of the stars of the Web 2.0 revolution. "I have 40 open positions at the moment, I need ten Java engineers and I just can't find them," which is slowing the company's growth.

Campbell Dobbin, CEO of software vendor Intranet Dashboard (another Web 2.0 success story), is also frustrated by how hard it is to find staff. "The skills shortage has stymied our business in two ways. First, senior staff have to spend more time on recruitment. I spend way too much time talking to my HR people. We've also lost the ability to grow as quickly as we'd like. If there were twice as many good young kids coming out qualified, I could give them all jobs. But they're just not out there."

But at least one commentator is willing to dispute the existence of a crisis, because he feels there are plenty of good kids out there.

in senior development roles where leadership, design and people skills are required, such as lead .Net and J2EE developers, solutions designers and architects," she says. "IT Business analysis skills are also in short supply in specific sectors where detailed current domain knowledge is required; for example Superannuation."

The reasons for this shortage of experienced staff are complex. "In 2000 there was a bit of a bust in the IT industry. Demand ceased after the Y2K projects wound up and that decline merged into the tech wreck of 2001," says the AIIA's Sheryle Moon. "Graduates couldn't find jobs in those years so understandably they went off into other areas and are not inclined to come back. That flowed on to school leavers who declined to go into IT degrees because they could not see a demand for jobs at the end of the degree."

Candle's Bianchini thinks mass retirements among baby boomers are an issue, while Sharyn Wise says that skills gaps are inevitable, given the fast pace of technology change.

Whatever the cause of the current crisis, businesses of all sizes are feeling enough pain

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WE ARE EXPERIENCING A SHORTAGE IN SENIOR ROLES. LEADERSHIP, DESIGN AND PEOPLE SKILLS ARE NEEDED

that they are trying to make sure it does not happen again by working with educators to make sure that future graduates are ready to step into the roles they are trying to fill today.

"We think there could be a major skills shortage in the future if we're not proactive about it," said Alan Noble, Google Australia's engineering director. "We are trying to avert a real skills shortage in the future by taking a long-term view about skills, working with universities to make sure that there are enough engineers to do what we want to do in five years' time."

Atlassian's Cannon-Brookes is also working with universities to find his company's future workforce. Even though his company is only a few years old, it already sponsors a number of scholarships, which he says "gives us a good entrée into the graduate market." The company also arranges six-month work placements for students, who Cannon-Brookes hopes "go back and tell their friends what a great place Atlassian is to work."

These measures will, he hopes, make it easier to find the people Atlassian needs to continue its growth. But he thinks the combination of more promotion about the opportunities available in Australia and more-than-occasional mentions of our beaches and weather can also help to alleviate the problem.

"I think we need to celebrate software development in Australia a bit more," he says. "There's not a lot being said about development here but there should be. We should be celebrating small software companies like us, but also the fact that big software companies like Google are coming here. That needs to be talked up because it lets people know that there is a vibrant IT industry in Australia doing exciting things."

OESTROGEN DEFICIENCY

Another reason often advanced as a source of the skills shortage is the gender imbalance in IT, which is dominated by men to an extent rarely seen in other professions.

Campbell Dobbin of Intranet Dashboard — frustrated by how hard it is to find staff.



"I think there is a real image problem in the IT industry," says the AIIA's Moon. "There is still a strong belief that it's nerdy and you spend your life in a cubicle coding."

The AIIA and Australian Computer Society are trying to break down these myths, and the rest of the industry hopes they succeed.

"Women bring different skills to the table," says Intranet Dashboard's Dobbin. Women tend to have a slightly more careful and planned approach to software development. Guys tend to rush it. They spend less time planning and checking at the end. It's a hare-and-tortoise situation where the women will finish first with a better product, although they progressed more slowly through it."

Google's Noble also feels women have a lot to offer the industry. "Women are particularly important," he says, "because we are working on software applications which are collaborative. The insights of women are important in this area because they think differently. Where the audience is women we need female developers. We also just want a balanced work environment." **AIIA**

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THE FATHER OF THE PENTIUM M AND CENTRINO

The Pentium M chip ignited the notebook industry and led to today's Core 2 micro-architecture. *David Flynn* talks to its driving force, Intel's Shmuel "Mooly" Eden.

He's the man behind Intel's revolutionary "made for mobile" Pentium M chip, and the equally radical Centrino platform. But you'll rarely find Mooly Eden, general manager for the chipmaker's flourishing Mobile Platforms Group, taking centre stage at any of Intel's developer conferences.

Unlike some of Intel's vice-presidents he leaves the evangelism to others, preferring quiet, one-on-one briefings to speak frankly about the development of the company's technologies.

Eden joined Intel in 1982, having followed his electrical engineering and business management degrees with five years in the Israel Defense Force and a stint at Israel's Tadiran Communications. He spent seven years Fab 8 — Intel's first wafer plant outside the US — but opted to move into chip design and began working with a cache design team. Later he became cache department manager and then found himself overseeing the design of the Pentium MMX which, he says, was "the first big microprocessor in Israel".

After four years as director and general manager of Intel's Israel Development Center, and following the launch of the Pentium M and Centrino, Eden was offered the role of director of marketing for the Mobile Platforms Group. "I had no idea of marketing! [Laughs.] I was

a pure design engineer, or what Intel calls a 'chiphead' — which is not an insult, I am very proud to be a chiphead," Eden says. "So I went to marketing... and later there was the opportunity to become general manager of the mobile group, so I had the advantage of having a background in process engineering, operations and marketing."

However, Eden's career was not without setbacks and easily the biggest of those was the ill-fated Timna project of 1998 — Intel's radical attempt to capitalise on the potential market for a low-cost PC by producing an all-in-one chip with integrated processor, graphics and memory controller.

"Timna was a brilliant piece of engineering but a marketing

failure" Eden recalls. "The idea was to come up with a very cost-efficient solution: to integrate the chipset, the memory controller, the graphics and the CPU on the same chip. We were the first ones to integrate the memory controller, but the risk with that is that from day one you had to bank on the memory technology.

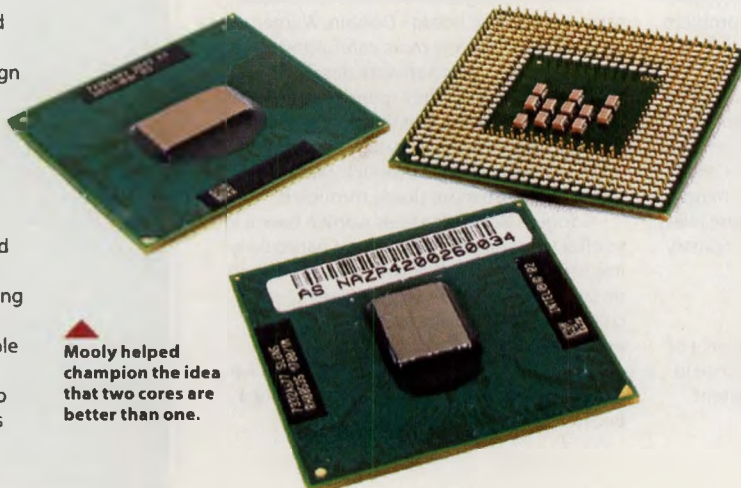
"The memory we voted for was RDRAM (Rambus), assuming that the price of RDRAM would come down, just like everything else. When we took the decision it was right but in retrospect it was the wrong decision, because after we finished the design the price of RDRAM was still very, very high. The chip was working on a PC, it was fully functional and it was a brilliant engineering achievement.

But from a marketing point of view it made no sense. And we had to kill the project."

Even today, over six years after Timna was cancelled in late 2000, there's no mistaking the note of sombre reflection in Eden's voice. "Timna was very painful for me and the team. When you're working day and night and weekends you get attached to it emotionally — it's not just a project, it's something deep inside you. So when we cancelled Timna it was like mourning, it was actually grieving. It took me more than a month to really recover. But it was also a very good lesson for myself and the rest of the team to think much more carefully about the market."

A survival instinct kicked in after the failure of Timna and led directly to the creation of the Pentium M, under the codename Baniyas. Eden says: "Baniyas was literally designed [from] the ashes of Timna. We wouldn't have been able to do Baniyas without Timna.

"We did the Timna post-mortem and learnt from our mistakes. I told the team, 'Intel didn't choose us because they like us or they like Israel. They chose us because we are good. We have developed beautiful methodology and beautiful thinking, let's take it and do it over with Baniyas. And for Baniyas to be successful we have had to really put our name on the computing map.'"



Mooly helped champion the idea that two cores are better than one.



A SURVIVAL INSTINCT KICKED IN AFTER THE FAILURE OF TIMNA

The gamble was as much Intel's as it was for Eden's team. The company's traditionalists and champions of clock speed were against the very notion of a chip that ran slower than the norm in a world where bigger numbers were better. "They thought it was a dumb idea!" Eden exclaims with laughter. "They didn't believe it would catch on, because we had educated the world for many years that frequency sells. One challenge was how we [could] sell it to the world — that we've got something that is better than frequency."

"Megahertz was a great idea: it delivered linearity which meant it also delivered performance. But at some point in time you start getting into the area of diminishing returns, and that's when we had to do this shift to power efficiency."

"Even when I was selling it inside Intel, I was explaining that in the car you've got two meters — one [shows] the speed you are driving and the other [shows] the RPM of the engine. And today with frequency we are getting diminishing returns,

so it's like RPM — the fact the engine is spinning very fast doesn't mean the car is going very fast."

"It took a lot of persuasion, and at the end of the day I believe it was a huge risk on Intel's side to accept it. But Paul (Otellini, then head of Intel's Architecture Group and now president and CEO) accepted it and said, 'Let's go for it.'"

Since the debut of the Pentium M in March 2003, the heritage of Eden's work has proved to be the foundation for Intel's shift towards improving processing efficiency — most recently through the introduction of multicore systems and the revised Core 2 microarchitecture now used across Intel servers, desktops and notebooks.

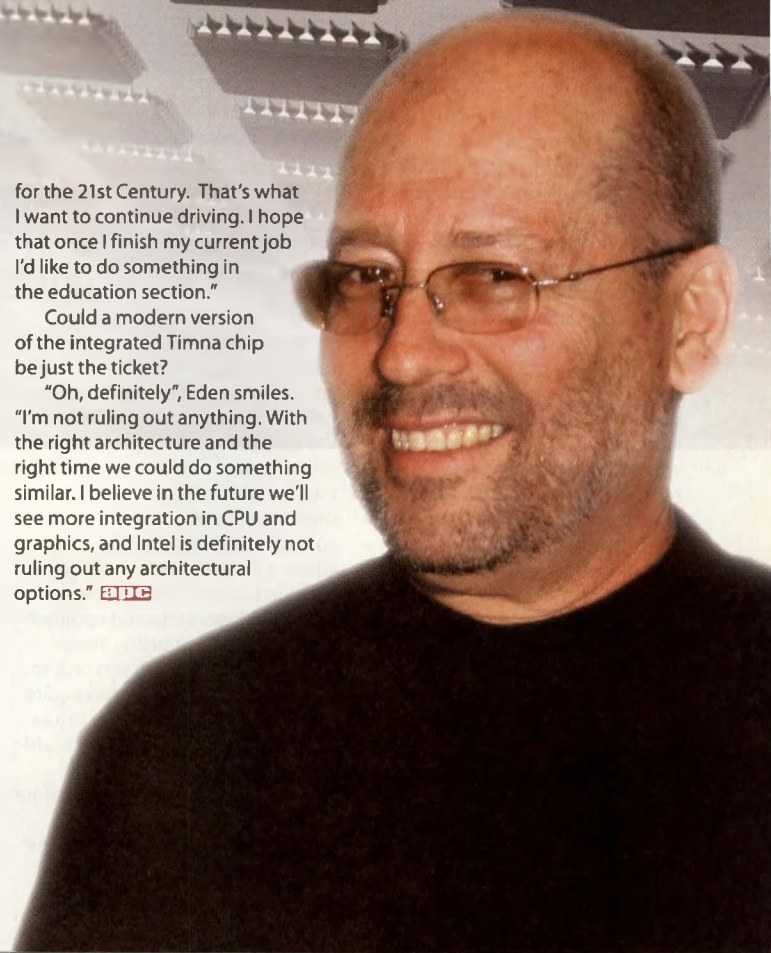
He still sees plenty of work to be done on the mobile platform — to make notebooks even lighter, with true 'all day' battery life and 'always on, always connected' status through Wi-Fi and WiMAX.

"But when I look forward, my dream is to see every child going to school with a notebook, being ready

for the 21st Century. That's what I want to continue driving. I hope that once I finish my current job I'd like to do something in the education section."

Could a modern version of the integrated Timna chip be just the ticket?

"Oh, definitely", Eden smiles. "I'm not ruling out anything. With the right architecture and the right time we could do something similar. I believe in the future we'll see more integration in CPU and graphics, and Intel is definitely not ruling out any architectural options." **ETC**



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No incompatibilities here

Upgrading to Vista on your primary home system might take a bit of confidence, but it needn't produce any headaches or problems.

Although I've been using Windows Vista for quite some time, I only upgraded my main home system from XP to Vista in late March. I would have done it sooner, but all the drivers weren't available and I wasn't about to run my primary machine on a platform hobbled together with beta software.

Making the move to a new operating system that you're going to rely on is always a daunting experience. When testing and simulating installations and upgrades, there's a comforting stresslessness in knowing that if it all goes pear-shaped, it doesn't really matter. Going through the same process on your own system with your precious, precious data always involves a certain level of gut-churning worry and panic.

It shouldn't really — data can be backed up and Vista will happily and reliably protect everything that's nearest and dearest to you. I was pleasantly surprised (and relieved) to discover that all the horror stories of program incompatibility were mostly baseless. Many people saw the popularised incompatibilities in Vista's early days as symptomatic of a fundamental problem with the operating system itself — and that to move to Vista was to throw user-friendliness and flexibility out the window.



Assume that Vista will run your apps just like XP does (but maybe do some research first, just in case).



IF YOU HAVEN'T UPGRADED TO VISTA BECAUSE YOU'RE AFRAID OF LOSING FUNCTIONALITY, MY ADVICE IS NOT TO WORRY

Not so. I'm a heavy user of third-party applications, some well-known, some highly obscure, and I also like my games. Just about all the applications I've installed aren't officially supported on Vista, yet they worked without a hitch. I didn't even need to use Vista's compatibility options. Gratifyingly, within a short time of installing the non-Vista-supported applications, most developers released updated versions, fully supporting Vista. Although pleasing, this was only to be expected — Microsoft was quite frustrated in the weeks after Vista's release by a general and inexplicable lack of support from software developers, but any decent software title wishing to stay relevant and competitive would waste little time in adapting to the new platform.

Games are a bit different, in that they make so many more demands on a system and are very susceptible to any problems or instabilities on the host operating system. There's no doubt that some of the very latest games don't respond well in a Vista environment, but many others take it all in their stride and function perfectly. Of course, gaming purists will look at system benchmarks between XP and Vista-based systems and demonstrate how running Windows XP boosts performance by 5%, and at this stage of Vista's development there's no arguing with the figures. However, not everyone is so caught up in gaming minutiae, and if the answer to the question 'So can my Vista system play the game or not?' is 'Yes it can', my guess is that most

users won't be too concerned with losing a few frames per second.

So if you haven't upgraded to Windows Vista because you're afraid of losing functionality or not being able to use your favourite apps, my advice is not to worry. Don't assume that simply because an application doesn't explicitly state that it doesn't run on Vista that it won't — assume that it will. The trend so far bears that to be the case. Of course, if there's a particular app that you simply can't live without and aren't prepared to risk, then do some research and check the support pages and forums. Better still, run up Vista with Virtual PC and test everything in safety.

But don't worry about Vista — it's doing a great job and is a more than worthwhile upgrade. **APC**



HastalaVista

by
James Bannan

James Bannan is a systems manager at St Leonard's College (Vic) and APC's resident Windows expert. He'll be checking out Vista for you every month.



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A Dell by any other name

Dell's announcement that it will pre-install Linux onto its PCs is a huge milestone in the OS's development — but not everything is a positive.

As I write this, Dell has officially confirmed it will be selling PCs pre-installed with Ubuntu. This is, of course, fantastic for Linux — that one of the world's largest PC manufacturers is offering to sell PCs with Linux installed is one of the single biggest acknowledgements of Linux as a mainstream OS.

No more can Linux be considered 'niche'. When you buy a new PC and have either Windows or Linux pre-installed, two options on the same level (well, one will cost you a heck of a lot more), it's just a totally different ballpark. It's actually irrelevant whether Ubuntu is a great Linux desktop or not; Dell's choice to bundle it is a declaration to the world that it's worthy of support and that if a giant like Dell can get behind it, then it *must* be good.

Fortunately, Ubuntu is good, although I did pull 7.04 apart in this issue and online for some obvious faults — justified too, especially now. For the first time there is going to be a tsunami of new computer users choosing Linux who have never done so before. They would have heard about it, seen it, but not trusted they could use it or that it was ready. Or maybe they *haven't* heard about it until now. Such people exist, apparently.

But now they can buy it pre-installed, they can dive in without



Linux Dells in Australia are now a question of when (not if).

having to think, and you can bet they're going to try — especially when it equates to a cost saving on the purchase price. And when they do, Ubuntu has to put its best foot forward (and better than any Linux distribution has in the history of Linux), because first impressions count. This isn't just about Linux hitting the mainstream: it's an opportunity to be grabbed by the pants and played for all its worth — here and now, where Vista is failing compared to XP and disgruntled users are looking for an alternative.

I wrote a few issues back that if Dell pre-installing Ubuntu should happen, it could impact adversely on the work done for other distributions. Ubuntu is already one of the most popular distributions, and now it will become the top

distro by a large margin. There's nothing wrong with that — it's a great and well-earned success. But in standardising so much on one distribution — as applications place priority on Ubuntu compatibility above all else — we will likely lose some of the very choice that made Linux, and Ubuntu, a success in the first place.

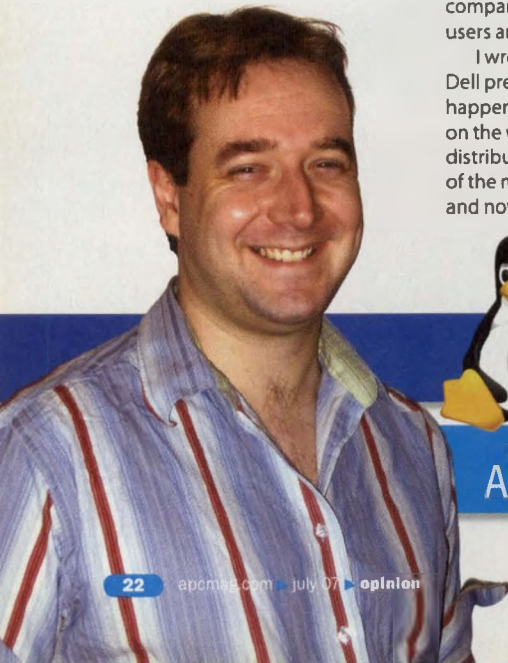
That said, change is inevitable and Dell's support of Linux is a significant milestone for Linux.

Unfortunately, as is frequently the case, we're going to have to wait a while to get our pre-installed Linux PCs in Australia. Dell US isn't just the pioneer — the company has never ventured this far into open source territory before, and you can bet there are going to be lessons learned in how the products are

built, marketed and supported. The good news, though, is that it's not a question of if these machines come to Australia, only when.

All up, Dell's selling of machines pre-installed with Ubuntu is a landmark in the history of Linux. From here on in, industry support will grow, companies both large and small will migrate, previously closed hardware vendors will loosen their reigns for support, and who knows — you may even see us in APC benchmarking products not just for how well they run under Windows, but also under Linux. You'll know we've arrived when the latest Nvidia 11000X Eleventy-Hundred GTX has a whopping great big sticker on the box stating 'Made for Ubuntu!'

Oh boy, I can't tell you how long I've been waiting for that day. [ETC](#)



LinuxWindow

by
Ashton Mills

Editor of the Linux Pocketbooks series, and more recently Atomic magazine, Ashton has been a tech journo for over 12 years, including five years with APC.

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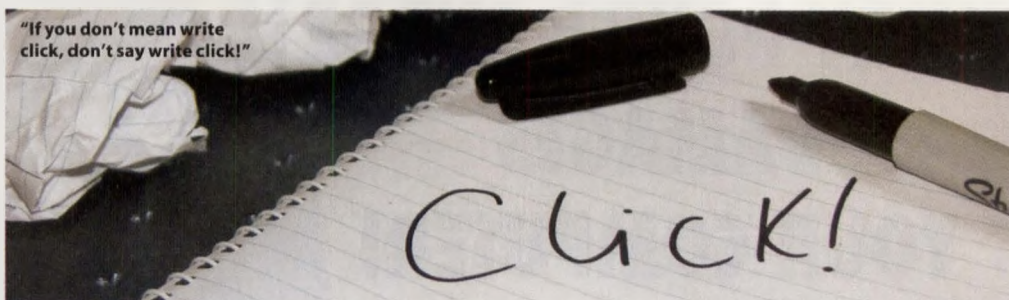
Networking seems to puzzle many end users, who can't seem to see why a computer needs a cable or its own internet connection to link to other computers.

Readers Michelle Dennis from Carrum, Victoria, used to work as a tech support for a high school. "One day I had a call from a very irate art teacher complaining that the internet wasn't working," she says. This teacher asked Michelle contemptuously, "Can't you guys get anything right?" Michelle then realised the teacher hadn't plugged the network cord into her laptop. "I explained calmly that in order to access the internet, she needed to plug the cord in and log onto the school network. She blinked at the network cord and smiled. 'So... what you're telling me is that if I take this cord home and plug it in, I can access the school network from home?'"

We sympathise Michelle, but it's more evidence that the unpleasant end users are often the stupidest.

BUT IT WORKED THE FIRST TIME

Reader Gurkan Yeniceri, an analyst and developer from Braddon, ACT, points to a misunderstanding about wireless. He recalls a customer who bought a wireless card and called to complain that he couldn't hook up to the internet any more. "After checking all the obvious things, the company couldn't solve the problem and sent a technician to his house. The customer said he'd brought the



IT'S YET MORE EVIDENCE THAT THE MOST UNPLEASANT END USERS ARE OFTEN THE STUPEDEST

wireless card home after he bought it, installed it and it miraculously connected to the internet straight away. Actually, he was connecting to his neighbour's unprotected wireless network. After a month of use, the neighbour enabled the encryption and he couldn't get onto the internet anymore. When he finally understood the situation, he was quite embarrassed. Ah, I wish it was that easy to connect."

WRITE CLICK

One reader, who wishes to remain anonymous, wrote in to say he was working as a network administrator in a large high school. "One day I had the usual sort of help call from the PE department. A teacher had borrowed another's logon and saved work on the other teacher's desktop, so it wasn't there when she next logged on as herself."

Our administrator suggested she log in as the previous user and copy the files to a common area from where she could copy them back to her own desktop. "After slowly trying to explain how to copy the files she wanted, step-by-step, I would say, 'Did you right-click?' and she would just keep saying, 'Yes, but it's not working...'"

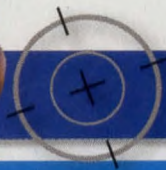
Puzzled, the administrator walked over to the PE staff room to find the user sitting at the computer with a piece of paper with 'click' written all over it.

"When I asked her about it, she said, 'You kept saying "write click", but it didn't work, nothing was happening!'"

"After making sure she was really serious, I patiently explained that her computer couldn't read from scraps of paper yet and gave her another lesson on using her mouse."

MAGIC DRIVE

Reader Jackson Wong provided onsite software support to an elderly lady. "After the support, she asked me if the database would be backed up too. I asked where she wanted to back up the file to. She pointed to the external hard drive on her desk, connected to the power. However, the problem that I found was its cable wasn't attached to the computer, nor was there any back up event schedule. Curious, I asked how she knew the backup was working. Her answer was classic: 'Well, see the light on the box? It's green. Does it mean it is running and backing up?' She'd bought the hard disk last year, left it powered on and thought this 'smart' external hard disk could somehow automatically back up her PC without being connected to it. Luckily she didn't need to recover her data at all!"



EndUser

from
The readers of APC

APC readers who deal with new computer users or incompetent IT administrators share their survival stories.



PULLING HIS HAIR OUT IN FRUSTRATION

This one was a hot contender for the position.

Suggestions have been made, votes have been counted — HelpDesk Ed stays! Hoorah! We've corked his fire-power though, so all those end users out there are safe in their stupidity.

We have made a decision on HelpDesk Ed's gun. He'll keep it, but in a modified version. It's a kind of politician's decision, we know. In the end, the weight of opinion was for Ed to retain the weapon, but we did want to acknowledge the views of some readers offended by it.

We've selected a few emails that give a sense of the feedback we received for retaining the original HelpDesk Ed:

"Let poor, frustrated HelpDesk Ed retain his gun and the devil on his shirt. To me it gets a message across without any real direction towards a copycat action that would result in harm to others..."

There was a time when toy guns were played with by every boy. Was that worse than the video games now available to all and sundry?"

Alex Wallace

"Firstly: I vote for the original HelpDesk Ed to remain — along with his gun. *Please keep him!* Secondly, I find it quite disappointing that your fine magazine is pandering to the lame politically correct minority, as well as using the Virginia Tech massacre as an excuse."

Scott Castledine

"I want you to keep the original HelpDesk Ed. He is harmless.

Don't you go listening to those moral do-gooders. Next thing, you

will stop reviewing games with shooting in them, too! *Bah!*"

Djeemale

"DO NOT replace the current HelpDesk Ed! There is nothing wrong with him. I am an IT support person (probably like many of your readers) and have never pulled a gun on even the stupidest user. Seeing HelpDesk Ed with one doesn't imply to me that it's OK to do that, either. We are all adult enough to know better.

So, please don't treat your readers like easily-manipulated, brainless morons. We do have the capacity to make fair judgment on what is acceptable behaviour and what is not. We certainly won't be compelled to shoot someone as a result of seeing a picture in your magazine. HelpDesk Ed depicts the "feelings" of many when they get frustrated, not the "result". That's probably why he was chosen in the first place!

I, for one, may cancel my subscription and tell others to do the same if you continue to assume your readers are morons. I thank you in advance for ignoring the whimpering of the moral minority."

Whatsortaname [real name withheld]

"I'm astonished that you were prepared to change an important part of your magazine — HelpDesk Ed — for the politically correct opinions of a couple of malcontents. What next? Drop the

Watchdog binoculars because they could be seen as belonging to a Peeping Tom? Maybe you should reconsider APC itself. How many trees in the Tasmanian wilderness have to be cut down for an edition of the magazine?

Then there's that list of people you publish each month who produce and write the magazine. A quick scan reveals a dangerously lopsided ratio of men to women. This is obviously sexist, the lone Melanie Farr in your team clearly struggling under a very heavy glass ceiling. Also, I don't see too many ethnic names in there either, although you do have a token Sbarski, a Caruana, a Bastounis and Chen and a Pham. Clearly APC needs to take a good look at itself, which I know you will because of your complete overreaction to the couple of readers who complained about HelpDesk Ed's gun."

Adam Gray

Melanie Farr replies: Don't worry Adam, the glass ceiling isn't heavy at all. Being the Chief Sub-Ed I've actually climbed to the top of my ladder and am standing on the roof!

So that's it then, Ed keeps the gun, but as you can see we've made it harmless. If there was a second choice, it was a tie between the hair-pulling and the strangling.

Paul Mansour wrote: "If we can't have 'the shooter' thanks to that numb-nut Robin, then my second

vote is for the hair-pulling picture, as I have lost most of mine putting up with idiots such as those depicted in your column. :-)"

We were intrigued by David Charles, who suggested the strangling option, but with a twist: "I especially liked the phone cord wrapped around the editor's neck..."

I would have liked to have seen the editor's face in a very deep shade of red, showing the effect of advanced stages of strangulation!"

OK, let's end this debate. HelpDesk Ed keeps his gun, but it's harmless. So keep sending in those End User anecdotes, we know there are more out there! **APC**



BANGING HIS HEAD WITH A PHONE

Self harm just isn't as much fun.

WINNERS!

This month's published End User writers win a Microsoft Wireless Notebook Laser Mouse 6000 worth \$99.95. The first laser mouse from Microsoft designed for notebook PCs puts ultimate performance in the palm of your hand. With new, proprietary high-definition laser precision, an ergonomic design and smart navigation features, the Microsoft Wireless Notebook Laser Mouse 6000 delivers more comfort and control than laptop touch pads and toggles. Featuring a snap-in receiver for easy storing and longer battery life, the Wireless Notebook Laser Mouse 6000 connects directly to a USB port. IntelliPoint mouse software (included) is necessary for full functionality.



SEND US YOUR CONTRIBUTION AND WIN A PRIZE!

Send in your tales of woe involving dumb end users or incompetent techies to apcenduser@acpmagazines.com.au and if we print it, you'll win a prize. You must supply contact details in order for us to verify your contribution.

Are you being served?

When Susan Smith took her son's unrepaired PC back to the repair shop, she got a real serve (and not the kind she was expecting)...

My son's computer crashed and failed to turn on, so I delivered it to Computer Guru for repair, and it was collected and paid for (\$416).

When my son attempted to use the computer for the first time since its collection, it worked for approximately three hours and has failed to turn on since. I returned the PC to Computer Guru for further assessment at the first possible opportunity.

I entered the shop and an employee asked me if I had the service documents. I replied that I didn't. I gave him my son's name. He said in an aggrieved tone that I just had to wait while he looked it up. He then became very angry and said that I should have brought in the paperwork and that it would take him some time to find it and intimated that I was becoming impatient. He continued to rant, and I said that I was sorry if he had had a bad day, but that I hadn't done anything to upset him. He told me to "Get out!". I was very taken aback.

When the boss was available, I tried, through tears, to explain that I had made no complaint, and was in fact just a messenger delivering the computer to see what they could do. The boss told me to take my paper and go, that it had been repaired three and a half weeks ago and that, if the computer didn't work, they would have expected a call straight away.

This certainly doesn't meet my expectations as a consumer. To be rejected out of hand without consideration and then to be so rudely spoken to is appalling in my opinion. I feel that people should be made aware of this company's apparent modus operandi.

**Susan Smith
Clayfield, Qld**

Watchdog contacted Computer Guru and asked them to comment on Susan's accusation of ill treatment. After first attempting to resolve the issue with his former customer,

Director Warren Liddle offered us the following reply:

Dear Watchdog,
Consumers have the right to fairness and courtesy in *at least* the same measure as they extend it, but traders also have the same rights, and, in this case, we felt let down.

Mrs Smith was asked for the most basic information needed for warranty support anywhere: a reference, invoice, job sheet, date or

she had been rudely treated, unnecessarily questioned and fobbed off in an attempt to avoid responsibility. I told her I could not help her unless we could have a calm discussion. She took the sheet and angrily asserted she would take the matter to "Consumer Affairs" and left.

To paint this as avoidance of responsibility or rudeness is inaccurate. It attempts to make a case on personality rather than fact.

apologetic phone call and letter from Computer Guru, who had offered an on-site examination of the PC, but she countered that his apology might have seemed more sincere if he had contacted them in the two weeks prior to receiving notice of APC's investigation.

"I have spoken with my son and he says he doesn't want Computer Guru to touch his computer again and is prepared to cut his losses. I have found all of the dealings



I TRIED THROUGH TEARS TO EXPLAIN THAT I HAD MADE NO COMPLAINT AND WAS IN FACT JUST A MESSENGER

a basic description of the problem — or a modest level of patience while background information was located from files.

Mrs Smith was insistent that she leave the PC without providing any of these things and became 'flustered': a reaction common in the uninitiated when asked to explain PC doings — but not attributable to rudeness on [our] part! Mrs Smith's assertion that our employee became rude without any provocation is neither logical nor is it the case. Her emotions simply got the better of her.

The staff member, somewhat unnerved by her tears, told her in a normal voice (at no time did either party raise their voices or use harsh language) that her options were to have patience while the file was found, speak to the manager or leave. He did not say "get out" at any time. At my desk she was emotional and said that

I stand by our procedures, actions and demeanour towards Mrs Smith and submit that she has grossly misunderstood both our tone and motive.

Subsequently, and as a conciliatory gesture, I offered, along with an apology for any misunderstanding of her tone or her intentions on our part, an in-home visit to diagnose the PC. To date, I have had no reply to that offer made both verbally and in writing.

**Warren Liddle
Director,
Computer Guru**

Susan thanked Watchdog for looking into her complaint and confirmed she had received an

with the company to be very unpleasant... I do not reside from my factual report of events... We wish to have no further dealings with Computer Guru in any manner and my initial report to you was meant as a warning to others."



Word to the wise: always try to provide as much information and documentation as you can to your service provider.



HOME IMPROVEMENT

Boris Aguilar of St Leonards, NSW, had been a long-time Optus internet and phone customer but wrote to APC about "having a terrible experience." When he and his partner moved from their former residence in Pyrmont, Boris decided to "finally take the plunge" and get a two-year contract with Optus for broadband.

"I set up everything with all the service providers — including Optus and OptusNet — to install a new telephone line and telephone service and to transfer my ADSL2 as well. I was told a 15-day wait was expected. After a million phone calls, letters and speaking to dozens of 'customer service representatives' promising the earth, I still have not had the services connected. Optus has made blunder

after blunder after blunder, including trying to connect my telephone to the wrong exchange, trying to connect my telephone to my previous address and now unilaterally cancelling my telephone service and charging me a \$265.12 fee for breaching my ADSL internet contract."

An Optus spokesperson told APC: "Optus would like to apologise for the inconvenience caused to Mr Aguilar. Optus is committed to providing the highest quality of service to its customers. Optus has investigated this issue. This is an isolated incident and has been traced to human error. Optus is working directly with Mr Aguilar to resolve this issue as soon as possible."

Boris confirmed to us later that the Customer Relations Group assisted

him to have phone and internet restored in his new address and "everything has been working since." However, he told us he believed that if he hadn't complained to APC and the Telecommunications Ombudsman he would have got nowhere, and "[u]nfortunately, the buck-passing and inaction can only be counteracted by [institutions] like yourselves. . . I absolutely despise the way companies like Optus answer questions in that corporate garbage speech. . . It takes a lot of hard work to fix all this, and a lot of valuable time is wasted dealing with these people. Who pays for that? It also required one CRG person to work on my case. How many customers receive the royal treatment?"

INTERNET THAT FLIES?

I have three ADSL broadband accounts at different offices, all with Dodo. I noticed on Dodo's web site that it had changed its plans and I could get a 512/128 plan for the same price I was [already] paying for 256/64 — \$49.90 per month. I duly rang Customer Service (this would be the most outrageously-named department I have ever come across) and after waiting approximately 20 minutes I explained that I wanted to change two of my accounts to 512Kbit/s.

Later, I checked my bank account to see if they got it right: of course, they hadn't — they had billed me \$69.90 for one account. So, I got on the phone and into the legendary Dodo queue for 'Customer Service'.

Eventually, when I got through, I was told that the account was to be terminated as they had a request for a transfer to another provider.

They couldn't tell me who the provider was, and I kept telling them I had made no such request. Today I came into the office and there ain't no broadband.

At no time had I lodged an application or given any consent to have this account closed or moved.

So how on Earth could this happen? Supreme incompetence!

**Glenn Andressen
Mallacoota, Vic**

Watchdog contacted Dodo and asked the company to explain exactly what happened to Glenn's broadband.

Dear Watchdog,

We have investigated the issues experienced by this customer — the matter was complicated because the customer has three separate ADSL accounts, and, when the customer first called, the upgraded service was not applied correctly.

In this case, the customer's ADSL account was incorrectly cancelled at the time when the customer contacted us, and the cancellation was logged in our system as a 'churn loss'. This should not have occurred and we are changing our systems, processes and training to make sure that this does not happen again.

**Scott Stavretis
Chief Operating Officer, Dodo**

Glenn thanked us for investigating but told us he couldn't really see how

three accounts made it complicated. He eventually bought a new account with TPG and praised them for a quick turnaround: "I have two other accounts still with Dodo, but will be changing them as soon as I can. A senior customer service representative from Dodo did call, but only in response to the complaint to APC and he could do nothing

more other than apologise for their mistake. It was way too late then. What was infuriating about all of this was the incredibly long wait times for customer service and their total inability to reverse the process, even after being promised on two occasions that someone would follow it up and get back to me. It just didn't happen."



watchdog@acpmagazines.com.au

Has an IT vendor or telco stuffed you around? Let us know about it and we'll chase them for a solution on your behalf. Letters sent to watchdog@acpmagazines.com.au must include the writer's full name, street address, suburb, state and phone number to be considered for print publication (please also include details such as invoice numbers and people you've spoken to). Address and phone details will not be published. All correspondence becomes the property of APC and is subject to editing.



The freedom of choice

Variety might be the spice of life, but sometimes people are just spoilt for choice. This month, one reader rebels against the variance in Vista...

I am not a fan of having different versions of an operating system. Didn't like it in XP and I don't like it in Vista. Browsing through various forums it seems many people are discovering the limitations of their chosen version after they have installed it. On the surface, Home Premium only appears to be missing three of the features included in the Ultimate version, but there are many differences between the two versions. This must surely lead to confusion and distrust of Microsoft's motives. Why do we need so many versions? Why can't there be one version with the user deciding which features

they want to install? This approach hasn't hurt Apple or Linux. Microsoft will argue different types of users only need certain types of functionality. The problem with this argument is Microsoft is deciding which features those users need. They're saying as a Home user you don't need to make image backups, and you don't need drive encryption or faxing capabilities. As a Business user you don't need DVD authoring or media centre requirements. Are they listening to what users want, or are they deciding what users want?

Graham Hartle
Somerville, Vic

SPRECHEN SIE USER?

As a current helpdesk analyst for a large Australian company, I take umbrage at Robin Miller's suggestion (APC May, page 27) that the End User tech support guy has poor communication skills and this is the cause of his

frustration. My colleagues and I are forever getting calls from users who are unable to clearly articulate their particular problem. Usually we work with them to ascertain the nature of the issue, but often the information they provide is inaccurate or erroneous and leads us on a wild goose chase. A case in point is the number of calls we get saying 'the internet isn't working' when what they really mean is 'I have entered the wrong password three times and locked my network account'. Clearly your tech support guy is a caricature of the frustrations felt by many in the IT industry at the general lack of common sense on the part of a small number of end users.

Andrew Marshall
Cheltenham, Vic

IN ALL FAIRNESS

I enjoy reading End User each month but, I think, sometimes as technicians we are guilty of not reading between the lines when talking to end users. I recently experienced an issue which was causing erratic behaviour to the thin clients across all of our sites.

Unsure of the cause, we needed to investigate all cases in order to find a resolution. A remote user called complaining of strange error messages on her terminal. I asked her to click the button in the lower left-hand corner of the screen and tell me what it said. I meant the Start-ish button on Wyse terminals. She interpreted this as the Menu button for display calibration on the monitor. This caused us both much confusion and frustration, as she was not getting the menu I described to her. In reality, she had in fact followed my instructions to a tee — it was me as the technician who wasn't specific enough.

Robin Tayler
Maroochydore, Qld

ROAM IF YOU WANT TO

Have just returned from a trip to Hong Kong, and took my Telstra HSDPA Next G Card. Fortunately, I had not activated global roaming. In the process of trying to do so (whilst overseas), I was advised by Telstra (and its web site) of the usage charges. I checked my math a number of times. The cost is \$0.015c per KB, which sounds really cheap, but works out at around \$15 per MB! That is outrageous, with the high speed service offers and the average web-browsing session



◀ Tech support frustration: what are the real causes and who's to blame?

letter of the month

ONE MINUTE TO MIDNIGHT

Reading the April 2007 issue of APC, I was incensed to find on page 47 an advertisement for Dodo ADSL2+ internet with — wait for it — a 50MB on-peak download limit, which at ADSL2+ speeds, would take just 30 seconds to use up completely! Of course, per-megabyte charging applies afterwards. I think it's fair to assume potential customers for Dodo's cut-price (\$19.90 per month) internet plans would most likely have less than average technical know-how and not much spare cash in the bank. Just how many of these

customers will end up with a very hard to pay \$99 (capped) internet bill at the end of the month? Whatever happened to the business ethics of such companies? More importantly, why is there no government regulation — enforcing, for example, a legal minimum 2GB per month data cap — to stop ISPs offering such obscenely crippled broadband plans? I'm sure your readers would agree it's these types of business practices which are one of the major issues in the uptake of broadband in Australia.

Adam Gawronski
Beacon Hill, NSW

Adam wins this issue's Letter of the Month prize, a Logitech Cordless Desktop MX 3200 Laser keyboard and mouse set valued at \$199.95.



Would you buy a subsidised student version of Office 2007 from this man?



being easily 10 or 20MB without any problem — the cost per 10MB is \$150. I wouldn't want my notebook to download any Windows service packs in the background... I find it hard to believe that any rational human being would ever use this service that is nothing short of highway robbery. Telstra's response: "The high charges are due to using other carriers' networks overseas" (unlikely to be that high). In Australia, a 1GB plan is \$99, which means 1MB is around 99 cents, so where does this markup of 1400% occur? Be warned of serious financial damage.

Michael Gruzin
Beaconsfield, NSW

IT'S IN THE POST!

As a security guard, I work long hours and am looking for anything interesting to read. I recently bought a copy of the May 2007 edition of APC at my local petrol station. On arriving to work — and after reading from front cover to back cover — I noticed that the magazine didn't hold a copy of the free software disc. Bugger, I thought, as I was interested in anything for free (especially when it is good and usable). So getting home after 14 long hours of night shift, I forgot to stop into the petrol station to complain (bugger again). Oh well, just goes to show that APC has really good stuff to read about (because you don't even realise the disc is missing!).

Elizabeth Hogan
Mandurah, WA

BLUE RIBBON AFTER ALL

Anxiety accompanied my purchase of Microsoft Office 2007. I was worried about that new interface (tremble)... the Ribbon. My first reaction? Add a forked tongue at one end and a tail at the other. Where was everything? Then my brain sloshed laterally a bit and sparked up a light bulb. It isn't all that different — really! The trick is to think of the tabs as the top-level

menu, and the Ribbon as a kind of horizontal drop-down menu, only longer and more comprehensive. The same old commands are still there, and less obvious ones no longer require an archaeological dig to discover. Though I was initially irritated that some common commands now require an extra click or two (eg. inserting page numbers), especially when shuffling through tabs, some thoughtful customisation of the Quick Access toolbar solved all that (and with no more tweaking than the old tool bar needed). The *real shock* to Office 2007 came when I went back to the old interface on another computer, only then to fully comprehend how badly the interface needed the makeover.

Lesley Pantlin
Bardon, Qld



A GRAND DON'T COME FOR FREE

As a university student, the idea of spending a grand on Office 2007 was just inconceivable, but luckily I found it at <http://itsnotcheating.com.au> for a mere \$75. Targeting uni students is an ideal way to get the next generation to learn how to use their applications, but what about the current generation? The cost to train employees how to use Office 2007 outweighs the immediate benefits, given that the efficiency won't improve. An employer might be more inclined to just employ a uni student who already knows how to use it. Despite Office 2007 giving me the impression Microsoft thinks we're all idiots and can't grasp the complexity of a few drop-down menus, I'm happy with my purchase. At least it wasn't \$1,000.

Tim McMahon
Brunswick, Vic

MAKE LOVE, NOT WAR

A growing trend in video game development is a huge number of games based on war, some set in WWII and others in more recent conflicts (either fictional or loosely based on truth). The included full version of America's Army on your May cover disc is further proof of this. Is this sort of game truly what gamers are asking for, or is it an attempted propaganda assault in the guise of entertainment? Games have evolved so much in these past few years, with stunning graphics now expected as the norm. This rise in graphics has seemed to coincide with a decline in story development in games, with developers sticking to the same formula over and over again. Developers, there's more to gaming than war. Good games are meant to take players on a journey into a rich and diverse world that they can become immersed in and come to love. With DirectX 10 and the flood of new hardware that will come to support it, I'd hate to think the only thing we'll be able to do with it is shoot at some Nazis on a battlefield.

Blake Walters
Narangba, Qld

epinions@acpmagazines.com.au

Come on, have your say! We want to hear what you think. Add to these discussions or email your views (in fewer than 250 words) to epinions@acpmagazines.com.au. All correspondence becomes the property of APC and is subject to editing. Letters must include writer's full name, street address, suburb, state and phone number to be considered for print publication and to be in the running for Letter of the Month prizes. Address and phone details will not be published.



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1

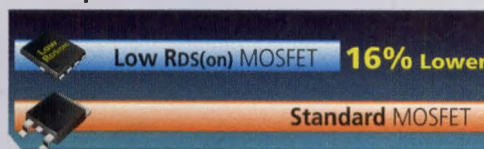


Ultra Cooling

Low RDS(on) MOSFET Design

Low RDS(on) MOSFETs are specially designed to produce lower switching resistance for faster electric current charging and discharging.

Temperature



2

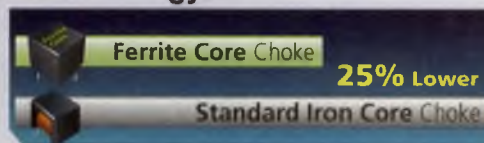


Low Power Loss

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3

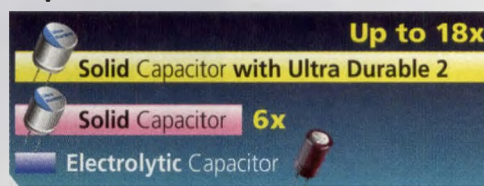


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GIGABYTE



This month in Labs... The big IT circle

It's a truism that things move in cycles. Fashions go in and out; the stockmarket goes up and down. And it's the same with CPUs, which work in cycles. But if you take a step back and check out the forest, the entire hardware industry works that way too. There's a rhythm to the way hardware is released, and sweet spots (as well as low points) when it's wise to buy or run in the other direction. For each generation of hardware we have the following scenarios: there's the v1.0 blues: a new platform, card, tech or chip comes out, is meant to change the world and, of course, barely works. I'm guilty of buying this kind of gear all the time. Not for the faint-hearted.

Next comes the patching and revising: bringing the new product

up to scratch, to be what it was meant to be in the first place. This is make or break for the product. If it doesn't succeed at this point, then rarely will it go on to achieve market success. People who buy the technology at this point are effectively beta testers kept very busy by some companies that release stuff before it's properly baked. You all know who they are.

After that, the process levels out. The bulk of the market starts to accept the product, the prices drop, and you've a good chance of buying a reasonably stable product at a good price. Here's where most people buy their tech, and it's where you usually get the best support.

The last part of the cycle, and one that is commonly overlooked

is the final product. It's when the companies manufacturing the product are usually moving it out the door with low prices, selling a once-premium product as a budget solution. The thing is — at this stage — the product is as good as it's ever going to get. Theoretically, it's stable, having gone through many hardware or software revisions, with masses of online tech support and it comes in at the right price as well. So, next time, when you're building or buying a PC for Mum, or cousin Andy, or someone who isn't particularly technology-savvy, consider buying those last-generation products. They'll create less hassles, need less driver updates and will run cooler and quieter and need lower maintenance.

The irony is that what I'm talking about is the same product. In each part of the cycle, there's no change as to what the particular technology is meant to achieve. There's few industries in the world where the time you purchase the product dictates what kind of experience you have with it. That's what makes technology so much fun — and so frustrating at the same time. **ETC**



THERE'S A RHYTHM TO THE WAY HARDWARE IS RELEASED — TIMES WHEN IT'S WISE TO BUY (OR RUN IN THE OTHER DIRECTION)

NICK RACE — TECHNICAL EDITOR

Geeks



FIRST TEST

Intel's new Centrino

More performance, more battery life and more features — the new Centrino platform will transform mobile computing.

Whether the first Centrino release was a response to or an effect of the rapid growth in the notebook's popularity at the time, it provided the first consensus of targeted mobile computing improvements — battery life, wireless connectivity and overall performance. Now these feature improvements have been bolstered and added to, with, at launch, two distinct flavours of the latest Centrino. Centrino Pro targets the business user whereas Centrino Duo is for everyone else. There's talk of a Centrino Duo Extreme Edition to follow, catering for the gaming community with less emphasis on battery life and more on speed.

The perennial choice between a desktop or laptop may no longer depend on price and performance but instead on what the desktop lacks and the laptop has gained. Turbo Memory is a case in point. The NAND flash memory hard disk enhancement technology vastly improves performance. It also promises to extend both the life of

the battery and the hard disk, as it reduces the amount of read/write activity on the platters. Turbo Memory is such a fundamental change to data storage we have focused specifically on this and other flash enhanced hard disk technologies on page 32. The bottom line is you will want it, especially as it will only minimally increase the cost of buying a new Centrino laptop.

BATTERY LIFE

For performance improvements alone, Turbo Memory will make it onto desktop PCs at some point soon, but its effects on battery life will not be realised. And the overall contributions to battery life extensions will be the most evident with Centrino's release. The new GMA X3100 graphics chipset, released alongside the new Centrino, is designed with a maximum overall laptop TDP (Thermal Design Power) limitation of 35W. It achieves this with several new battery-saving features including support for D2P0 panel

intensity dynamic adjustment, as well as display refresh rate switching which reduces the need to redraw an image on a screen when it's not moving. GMA X3100 isn't required for the Centrino badge, you'll find better graphics performance elsewhere.

If battery life is a crucial factor in your choice of laptop, then along with the power-saving enhancements of the X3100 and Turbo Memory, there are new SpeedStep enhancements.

A new processor sleep state, known as DC4, shuts down large portions of the CPU during idle periods with occasional interrupt request sweeps to see if it needs to wake up. A new lower active state allows for a change in bus clock frequency, so battery life is longer when playing DVDs and music.

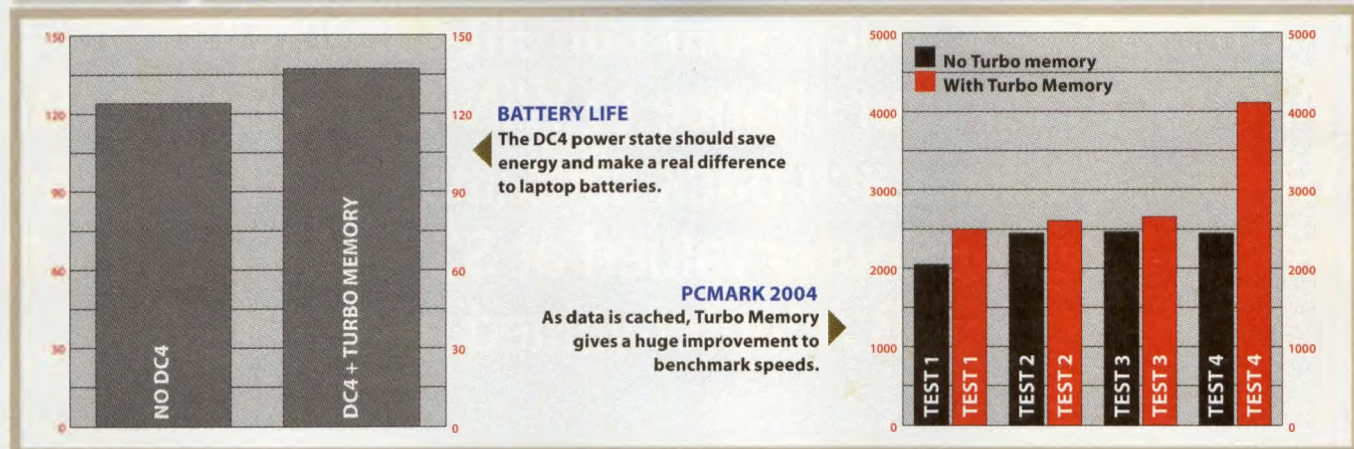
We found this happening when comparing two laptops with the new platform, one sporting a Turbo Memory drive (and DC4 support), and one without; the positive difference on the fully-tooled

machine, which lingered at 94% battery as its opponent was 90%. The end of the line was similarly positive; the DC4-enabled machine managed an extra 16 minutes life over its otherwise identical brother.

However, the graphical TDP changes didn't exactly show themselves with much clarity. The top time on our white box systems, playing visualised MP3s in Media Player, was a mildly disappointing two hours and 17 minutes; whether commercial implementations of the mobile 965 chipset can squeeze a little more life out of the package is so far unclear.

Dynamic processor core speed changing is also used as part of the new single core Turbo Mode boosting. In all models of Core 2 Duo from 1.8GHz, one of the cores can jump in clock speed by up to 0.2GHz in response to a single application's need, and all still within the 35W TDP. This process is synonymous to the way Hyper-Threading used to work — the active core takes the extra TDP headroom from the idle core to

PERFORMANCE RESULTS



gain the increased performance.

The new Mobile 965 Express chipset family brings support for the new sleep states and dynamic speed switching of the enhanced mobile Core 2 Duo. There's also increased Serial ATA I/O bandwidth at 3Gbit/s, extra USB 2.0 port support and the Matrix storage controller improves its rapid recovery technology.

The differences between the Pro and Duo versions of the new Centrino can be summed up as additional security for and control over the Pro user. Remote administrator services are also enhanced with Intel's version 2.5 of its Active Management Technology (AMT) bringing additional over-LAN firmware addressing functions for diagnostic discovery, healing and protecting. To receive the Pro brand over the standard Duo, Intel's 82566MM Gigabit Networking Connection with AMT 2.5 firmware and a Virtualisation Technology-capable BIOS should be present. Both wired and wireless LAN



WITH THIS RELEASE, INTEL'S LEAD OVER AMD AND VIA HAS EXTENDED, ONLY THE CHEAPEST OF LAPTOPS WILL FEATURE NON-INTEL CPUS

management is capable.

With several wireless technologies, Intel has made some judgement calls as to which integrated support would be most suitable. It already called off support for 3G on pricing grounds and WiMax wasn't quite ready — if you require these, both can be added later through either ExpressCard or mini-card PCI Express add-on boards. The new Wi-Fi Link 4965AGN provides quad A/B/G and draft-N support, giving you the maximum currently available data transfer speeds, MIMO (multiple in/ multiple out) support, and the added bonus of support on the less-used 5GHz bandwidth when using 802.11a. To quash any doubts over pre-ratification support for draft-N, Intel has undergone

interoperability tests with major wireless kit manufacturers producing the 'Connect with Centrino' badge which will be on kits that pass the test.

OVERALL PERFORMANCE

How does overall laptop performance now fare under this revision? The frontside bus gets a speed hike to 800MHz. Yes, the desktop is currently dizzying at 1,066MHz, but again a 35W TDP is Intel's target here and maybe an Extreme Edition will be allowed to burst through this barrier.

Performance, despite the massive amount of wattage shaved, was as expected for a system of this strength. Though Vista has proven to make our more reliable benchmarks curl into a ball, we did get a good showing out of

PCMark04. The better of our two test machines did its job perfectly, utilising Turbo Memory to extract an ever-increasing benchmark score; by the fourth run, it earned 4,114, a fraction higher than the non-TM score of 3,981.

Unlike other Centrino releases, this new platform doesn't come with a new processor revision, but it doesn't matter. Now Centrino defines the laptop platform of choice with a set of features designed to attend to the needs of mobile computing. With this release, Intel's lead over AMD and VIA has extended with only the cheapest of laptops likely to feature non-Intel CPUs. But for any laptop user with needs beyond the most basic of requirements, only a Centrino laptop will do.

Ian Robson

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Solid state of the nation

NAND flash technology has come of age, but will it make it to the centre of the storage world?

There's nothing Seagate, Hitachi or Western Digital can do about it. Those giants of the spinning disk world must be quaking in their boots. The flash storage revolution is coming and it could well wipe that last bastion of ancient mechanical technology from the face of the PC world.

Opto-mechanical drives have always been an aberrant part in the PC. Despite the perfection of their mirrored spinning platters, the hard drive — even the latest 750GB capacity monsters — is a real performance bottleneck, not to mention a serious power drain when it comes to mobile systems.

A replacement for hard drives has been expected, and with Intel and Samsung getting into the act with hybrid drive technologies and entire replacement drives, the solid state drive is here.

FLASH BANG

We're all familiar with NAND flash technology. USB thumb drives,

memory cards and music players like the iPod nano all use NAND-based flash memory. It's a cheap, solid state memory technology suited to a storage role as it's accessed in a sequential manner with data stored in blocks of pages. It has a higher access speed than other solid state technologies (such as NOR) and a longer lifespan of at least a million rewrites, if not three million plus. As with spinning disks, NAND-based drives can suffer bad blocks. Error correcting and bad block mapping can be performed on-the-fly — when a bad block is detected it'll be marked and won't be used again, and data will be moved to a free area.

Flash chips are grouped together to build up capacity. Currently Samsung is producing individual 8GB chips, and these can be used together to produce drives of higher capacity. It seems four is optimal, with Samsung opting for a 32GB IDE flash drive, while www.adata.com has a 128GB drive that



Intel's Turbo Memory, codenamed "Robson", is designed to bump up the speed of mechanical disks.

FLASH MEMORY

Samsung 32GB Flash SSD

• **SUPPLIER** Samsung
• **ONLINE** www.samsung.com.au
• **VERDICT** ★★★★★

While hybrid drives and Turbo Memory could be thought of as an interim solution, the future will be entire drives constructed out of NAND flash. A glimpse of that future can be seen in Samsung's latest 32GB solid state drive. Oddly packaged as a 2.5in PATA UDMA66 drive with four 8GB NAND chips integrated into its PCD, it installs and works just as with any other PATA drive being recognised by BIOS and Windows.

In use, the strengths and weaknesses become

instantly apparent. With an access time of 0.2ms, random or sequential data is treated the same, read at just over 50MB/s, while writing is only half this, at best around 24MB/s. This is fast, and the difference it makes to use is immediately evident.

Interestingly, PCMark's hard drive benchmarks show this drive running twice as fast as a standard 200GB SATA desktop unit. Considering the rugged nature of SSDs, the silent operation, and future speed increases, the potential for SSDs is looking tremendous — as long as the price comes down. At nearly \$25 per GB, flash doesn't have the lead over mechanical in terms of cost. Yet.



TEST	INTEL TURBO MEMORY	SAMSUNG MCAQE32G5APP	SAMSUNG 160GB HM16HJI	GENERIC 200GB HDD
HD Tach				
Avg read	26.4MB/s	48.8MB/s	36.5MB/s	55MB/s
Access time	18.4ms	0.2ms	17.6ms	12.6ms
Sandra				
Seq read/write	Not Available	53/25MB/s	43/44MB/s	62/58MB/s
Ran read/write	Not Available	52/11MB/s	29/33MB/s	44/41MB/s
PC Mark 05				
XP startup	9.0MB/s	16.4MB/s	5.8MB/s	8.4MB/s
App load	7.8MB/s	14MB/s	4.5MB/s	6.4MB/s
General use	6.49MB/s	9.8MB/s	3.8MB/s	5.4MB/s

utilises a SATA interface in a 2.5in drive package. Using Moore's Law as a guide, 256GB and 512GB flash drives should be common by 2010, large enough for system boot drives.

Fast access times are a feature, even early devices showed access times in the points-of-milliseconds level, compared to traditional drives that peak at 10 milliseconds. Spinning discs can only read what's currently under the single read head array. If it misses the data, the platter makes another revolution, that's on top of the time taken to get the head initially into position.

There are a few very common situations where this behaviour causes spinning drives real trouble. The first is when it's trying to load lots of small files dotted all over the drive. The second is trying to deal with a badly fragmented drive. The third is when multiple tasks are trying to access data from all over the drive. All of these result in drive thrashing.

If this is happening, a drive with a sequential speed of 100Mbit/s

plus is pointless. Flash memory with a random access speed a hundred times faster than a traditional drive, can cut through these tasks easily.

ROBSON LIVES

With the capacity now making a difference to drive speed, the question is how to implement it,



THE FLASH STORAGE REVOLUTION IS COMING AND IT COULD WIPE THE ANCIENT MECHANICAL TECH FROM THE FACE OF THE PC WORLD

as the unit price is still high. This has resulted in a hybrid solution which is now available in different guises.

We'll be hearing a lot about Turbo Memory — previously known as 'Robson' — part of the new Centrino Duo and Pro architecture. The idea behind it is the same as the ReadyBoost technology in Vista and the Samsung 160GB hybrid drive, you take a reasonable-sized lump of flash memory and use it to cache often accessed files. Demos from

Intel show it can increase real world application performance by 100%.

As the Turbo Memory allows the hard drive to spin down more often, it'll improve battery life and drive reliability, as allowing drives to power down reduces the risk of head crashes while moving the laptop in use. Intel doesn't state Turbo Memory works faster than ReadyBoost. It does stress ReadyBoost can't offer any power savings for mobile platforms or be used to cache any permanent files — such as the swap file — as Windows will see the USB key as a removable device, while Turbo Memory is permanent.

The solution's success depends on the quality of the caching algorithms, but such things tend to be very well known. The other is the size of the cache used. The Samsung hybrid is 128MB and 256MB, Turbo

The final solution will be full solid-state drives or SSDs. Samsung has the 32GB Flash SSD — using four 8GB flash memory chips, it's packed as a standard 2.5in 40-pin PATA hard drive supporting UDMA66. It's an odd mix (why no SATA?) and not destined for mainstream systems at the moment, but this won't last long: Samsung's figures show it expects to shift around 1.7 million SSDs in 2007, increasing to 90 million in 2010.

A driving factor is SSDs lower power consumption and their near imperviousness to vibration, shock and high temperatures. Tests showed total laptop power consumption dropped from 26W to 22W — under heavy drive use — by switching a 7,200rpm drive to the SSD.

While the advantages of solid state drives are clear, we're

Memory is offered in either 512MB or 1GB, while ReadyBoost tops off at 4GB.

Intel couldn't answer why larger Turbo Memory modules aren't offered, as 2GB or 4GB could be supported, it may be that Intel are holding it back for the future. Perhaps the increase in speed doesn't justify the cost. Or maybe Intel fears that by the time the costs have dropped, full-sized flash drives will make it irrelevant.

currently in a transitional period. Hybrid drives, Turbo Memory and ReadyBoost all promote this emerging technology. Even when large enough SSDs are used as primary boot devices, it seems better to retain a larger capacity opto-mechanical drive as storage. So while their role may be relegated to storage and backup, our spinning friends will be around for some time.

Neil Mohr

HYBRID HARD DRIVE

Samsung HM16HJI

• SUPPLIER Samsung

• ONLINE www.samsung.com.au

• VERDICT ★★★★★

The first hybrid hard drive on the market is from Samsung, which handily enough, manufactures the flash memory used within the drive itself.

Physically the drive looks and acts like a standard 2.5in SATA hard drive with a standard 8MB buffer.

The magic comes in the form of 256MB of extra NAND memory, which acts as a ReadyBoost drive when used with Microsoft's Windows Vista. That's right: it's only of real use with Vista. Other operating systems see the drive as a standard unit, and

Samsung doesn't even seem to make use of the NAND as a large buffer.

That said, the Samsung HM16HJI puts in a good performance for a 2.5in drive, with sequential access reaching 45MB/s and random access around 30MB/s, matching desktop 3.5in drives in terms of sheer performance.

In comparison to Turbo Memory, though, the drive is something of a disappointment. Considering this is the top of the range model, the 256MB NAND flash is half of what Intel will offer as the basic Turbo Memory option. What's worse is the smaller drives use just 128MB of NAND flash. It's all rather stingy.





AMD ATI Radeon HD 2900 XT

AMD's R600 has finally arrived on the graphics market.

We've come around again to another generational gap in the everlasting battle between red and green. With the release in mid-May of AMD/ATI's new flagship and long-awaited DirectX10 hardware, the Radeon HD 2900 XT, things are starting to get interesting again.

Nvidia's 8000 series of DX10 hardware has been available for months now, and Nvidia has established itself firmly as the leader of the as-yet-unused DirectX 10 market. Amazingly, the graphics market is one of the few that will sell a product that is essentially vapourware, while the software tries vainly to catch up.

Now, the Radeon HD 2900 XT is a brand-new beast compared to ATI's last-gen X1900 series. Previously codenamed the R600, the 2900 XT is built on an 80nm process, with other announced 2600 and 2400 series cards using a newer 65nm process. A fundamental difference between the new and old is the 2900 XT's use of a 512-bit memory interface, which increases memory bandwidth without having to use higher-speed memory. This choice allows AMD to keep the cost lower and also allows for speed bumps down the line with faster memory. The current memory runs at a clock speed of 825MHz.

Under the hood, the GPU is a completely new design. The 2000 series uses a unified

superscalar shader architecture, based around 320 stream processing units, general purpose processing units that can be designated (by the programmer, in advance) as vertex, geometry or pixel shaders. Of course, to earn the DX10 certification from Microsoft, the GPU needed to include geometry shaders, implementation of Shader Model 4.0 and stream output (among other things).



CUSTOM FILTER ANTI-ALIASING ALLOWS SMOOTHER BLENDING OF COLOUR AND MORE NATURAL-LOOKING 'BLUR' BETWEEN EDGES

A new feature AMD is touting to increase picture quality (which is just as (or more) important than frames per second, after all) is their new method of anti-aliasing. The method is named Custom Filter Anti-Aliasing (CFAA), and enables the ability to sample adjoining areas around the AA target, allowing smoother blending of colour, and a more natural-looking 'blur' between rendered edges.

Video has seen a boost also, with ATI's Avivo engine seeing the addition of the HD moniker and a swathe of new functionality. And video fans take note, the 2000 series is going to be a good one for HD. Avivo is now able to almost completely take over the decoding of video streams (HD decode acceleration), taking the load off the CPU. There's two independent display controllers, which allows

an audio chip capable of 5.1 surround into the video card itself. The audio signal is passed out of the DVI connector (ignored completely by monitors, so don't worry) and, with a separately sold converter, can be changed to a fully implemented audio/video HDMI connection; the first solution in the industry that follows the full HDCP and HDMI specs. There's also a complete

two monitors to be run with different resolutions and colour depth, plus two HDCP keys — one assigned to each DVI output on the card.

This brings us to another addition to the 2900 XT; audio. To follow a full, protected HDCP 'path' and follow proper HDMI functionality, AMD has integrated

HDTV analogue connection — for those of you who bought into that trap.

We fired up the AMD ATI Radeon HD 2900 XT in our Xeon test bench — with fire being the key word. The Radeon is a very hot beast, with temperatures under load easily approaching 80 degrees. With 3DMark, the card scored an admirable 11,699 at 1,280 x 1,024 resolution and 9,300 at 1,920 x 1,200. PCMark05 gave a system score of 9,306, with a CPU score of 9,543 and the graphics test suite at 13,472.

On the bench, the AMD ATI Radeon

HD 2900 XT is not as blazingly fast as it sounds on paper, but it certainly holds its own.

What's important here is the card's pricing. It's available at roughly the same price as a premium Nvidia 8600 card and has comparable performance. By no means can the Radeon HD 2900 XT compete against Nvidia's flagship 8800 Ultra in pure grunt — it's just not there — but it's certainly compelling compared to the 8600, especially with the premium video and HDMI functionality — and everyone loves a good games bundle.

Nick Race



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Nvidia GeForce 8800 Ultra

A speed and price bump for Nvidia's DX10 space heater.

The launch of the GeForce 8800 GTX six months ago saw Nvidia sitting uncontested at the top of the performance graphics pile. AMD/ATI's long-awaited and much-delayed R600 (now dubbed the Radeon HD 2900 XT as its flagship card) has brought some competition back in to the market. Now, with a target in mind, Nvidia has fired off a salvo, releasing a new, speed-bumped version of the 8800 card: the GeForce 8800 Ultra.

This release is purely evolutionary, rather than revolutionary, using the same manufacturing process and design as the GTX. The Ultra has really only seen an increase of its core speeds. The 8800 Ultra runs a core clock of 612MHz to the GTX's 576MHz, with

the shader clock getting a boost to 1.5GHz to the GTX's 1.35GHz. The memory clock has seen the biggest increase at around 20% up to 2.16GHz. Shader counts and ROPs, the memory bus itself and the memory amount at 768MB remain the same across the two models.

What has increased amazingly is the price, with the Ultra demanding up to a \$300 price premium in the same brand at retail and shelf prices as high as \$1,300. So does this 30% increase in price buy a 30% increase in performance? Not a chance.

What hasn't changed is the 8800 series cards as the performance leaders. ATI's R600 has seen initial performance scores equivalent to a quality 8600 card, leaving the 8800 GTX and Ultras unmoved at the top



of the benchmark charts. On the bench, the 8800 Ultra squeezed a System Test Suite score of 9,456 PCMark, and in 3DMark a whopping 13,148 score shows it's still the king of the mountain. In comparison, the Radeon HD2900 XT earned a 3DMark of 11,699, and the GeForce 8800 GTX tested on a slower testbench in January at 11,840. As it all washes out, the

GeForce 8800 Ultra is beyond doubt the fastest graphics solution for desktop PCs that money can buy. It doesn't, however, represent good value for money, especially considering the dearth of DX10 content, to which it's primarily targeted. If money's no object...

Nick Race

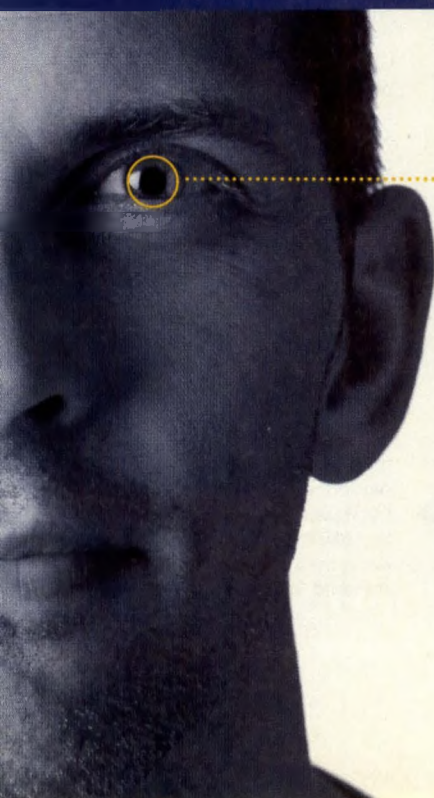
CONTACT	Nvidia
ONLINE	www.nvidia.com
MARKET	Performance enthusiasts
PRICE	\$1,100+

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★ ★ ★ ★ ★

✗ The price tag.

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Gigabyte P35-DS3R

Intel's new chipset makes an appearance.

The Intel Developer Forum in Beijing in April was full of talk about the new incarnation of the Core 2 Duo processors on the 45nm manufacturing process. They'll be cooler, more efficient and able to be bumped up to higher clock speeds across the board.

One of the most interesting things mentioned about the new chips is the support for 1,333MHz front side buses, an increase put in place to hopefully alleviate one of the banes of Intel's processor line-ups — memory bandwidth bottlenecks.

Of course, the problem then, is that there wasn't any Intel chipset to support the 1,333MHz FSB chips. Not any more! Intel's P35 chipset is the new mainstream solution for

the upcoming Core 2 Duo processors. It supports FSB speeds of 1,333, 1,066, 800 and 533MHz, native support for 1,066MHz memory modules and, most interestingly, support for DDR3 — the next generation of high-speed memory for the desktop.

A Gigabyte P35-DS3R motherboard landed in the Labs fresh off the presses in Taiwan and gave us an exciting look at the next standard for desktop motherboards (at least for the next 12 months).

The Gigabyte P35-DS3R motherboard uses the Intel P35 chipset: a new incarnation of Intel's ICH series Southbridge (in this case, the ICH9R) with RAID functionality built in, Realtek audio and Gigabit

Ethernet and support for DDR2 memory. It's an ATX form factor board sporting a single PCI Express X16 slot, three X1 slots and three PCI slots for older hardware. There's eight SATA ports and the usual collection of audio, cooling and IO.

Installed with an Intel Core QX6700 processor and using DDR2 memory, the P35-DS3R motherboard from Gigabyte earned a respectable 7,801 PCMark5 — within 5% of the performance of the same system

using a P965-based motherboard. This is reasonably good news, as the P35 is still so new — the inevitable optimisations of the BIOS and drivers should see more performance on top.

The P35 chipset is a great start from Intel for the next-gen desktop platform; however, we'll be waiting with bated breath for the performance part (the X38 chipset) and results from the DDR3 versions of the chipset (which are in the Labs, just waiting for the RAM).

Nick Race



• **CONTACT** Gigabyte
• **ONLINE** www.gigabyte.com.au
• **MARKET** Everyone
• **PRICE** \$270

✓ Next-gen CPU support; solid early on.

• **VERDICT** ★★★★★

✗ More of the same until Penryn arrives.

Adaptec RAID 3405 USC

SCSI for dummies from a long-time storage provider.

Adaptec is a name well known in the computer industry for a very, very long time as a trusted provider of storage solutions. With generations of servers using Adaptec SCSI controllers, RAID controllers and networks everywhere bolstered by SNAP appliances and Adaptec SAN solutions, there's very little data that hasn't been pushed around by an Adaptec storage device at one time or another.

Now changes are afoot. Adaptec has redesigned its business to support the SMB channel more than ever, withdrawing from the OEM market (selling chips to manufacturers to

• **CONTACT** Adaptec
• **ONLINE** www.adaptec.com.au
• **MARKET** SMB
• **PRICE** \$599

✓ SAS/SATA support; performance.

• **VERDICT** ★★★★★

✗ Price grows with cabling/battery.

place into motherboards) and a strong focus on selling standalone Adaptec products. This lets people choose the storage solution they'd like to use and let it grow with their requirements.

As one of the bigger pushers of the new SCSI standard SAS (for Serial Attached SCSI), Adaptec has launched the second generation of SAS and SATA

combined adaptors, dubbed Universal Serial Controllers for end users and the white box market. The beauty of SAS is that its compatibility with SATA allows the lower-cost drives to be installed off SAS controllers. So, you can start with SATA and upgrade to SAS disks if required, or populate your server with high-capacity and lower-cost SATA drives.

The new model we were provided for testing was the entry-level RAID 3405 model. This is a PCI Express X4 solution, supporting the direct attachment of four SAS or SATA drives. The 3405 supports RAID levels 0, 1, 1E, 5, 5EE, 6, 10, 50, 60 and JBOD, sports a 500MHz processor and 128MB of cache. All the new models in the series allow for 72-hour battery backup, which is sold separately. The 3405 is a slim form factor, allowing it to be installed in smaller 2U rack mounts and blade servers.

We tested a RAID 5 array of Seagate Cheetah 15k.5 SAS hard disk drives on the Adaptec 3405 using HDtch. The array managed a very respectable average throughput of 181.4MB/s and a random access speed of 6.1ms. The burst speed for the controller was at 420MB/s from cache, 100MB/s faster than the Ultra 320 SCSI standard. What's not to like?

Nick Race



ViewSonic PJ358

Going on a trip? This portable projector shaves off every last gram.

Plenty of portable projectors are now described as 'luggable'. While we would still be happy to sling such models around our necks, we'd be far more inclined to take this one on the road. Because, while the PJ358 (a cunning matte black re-branding of Hitachi's CPX1) doesn't exactly cause a revolution in overall size or footprint, bar a relatively slimline design, it's less than half the weight of most standard projectors — and that's a noticeable difference.

There's no need for any external adapter, as a standard three-pin cable is all that's required, ensuring that projector, leads and all weigh little more than two kilograms — a fully acceptable weight to hang off a shoulder. Compare this to your

laptop and you'll almost certainly find this far less dense. A padded carry bag is included, which provides adequate protection against scratches and light bumps, but we must raise a few concerns over the lens. With no dedicated lens cover, and the precariously exposed position afforded to it by the otherwise slimline case, that most pricey of components seems a little unprotected. You'd be a little upset if you scratched it.

Realistically, if you're in the market for a mobile projector, you'll want it light and bright. You might even want to leave your laptop at home, which is where the PJ358's built-in USB port comes in handy: reformat your slides as JPEG files, pop them on a FAT flash drive and

you can present PC-free. It packs a pair of VGA inputs (so multiple presenters can easily share the same projector), inputs for composite and S-Video, and audio in and out. What more could you ask for, bar DVI for a slight increase in clarity?

Brightness isn't an issue — 2,000 lumens is enough for the output to be seen in a well-lit room, but only just, and the colour definition is more than up to scratch thanks to the DLP processor at its heart.

The controls are well-placed and the

menus simple to use. Automatic vertical keystone correction means it's quick to set up too — and the reasonable throw distance makes it suitable for a wide range of rooms.

While there's nothing strikingly outstanding about the whole bundle, we have to give the PJ358 full 'does what it says on the tin' marks. Plus, it comes at a very reasonable price and is far easier to carry around than a massive TFT.

Alex Cox



CONTACT ViewSonic
ONLINE www.viewsonic.com.au
MARKET Prosumer
PRICE \$1,699

✓ 1.8kg; 2,000-lumens bulb.

VERDICT ★★★★★

✗ 1,024 x 768 XGA resolution.

Samsung Syncmaster 305t

Big and plain — a monitor that's really for a PC.

It bugs us a little when larger 24+ inch LCD screens are sold as monitors, but they're really just TVs with DVI connectors. Samsung's SyncMaster 305t is innocent in this respect, and it's a beautiful thing to behold.

Rarely will you find an APC writer applauding a lack of connectivity options for a device as a positive thing, but in the world of PC monitors, it means you can save some money for functionality that most won't use. Of course,

there's those who will want a dual-use device, but my guess is the numbers are slim.

The SyncMaster 305t is a computer monitor through and through. It's a 30in widescreen 16:10 LCD panel, running at a native 2,560 x 1,600 resolution with a refresh rate of 6ms and a brightness of 400cd/m2. This means this screen is big, bright and sharp. And it looks fantastic. Samsung uses its own S-PVA panels for the SyncMaster 305t, while Dell and Apple use LG's LCD technology for their 30in models, and the difference is discernible.

The 305t includes the basic input options as previously mentioned. There's a single dual-link DVI-

D input and a four-port USB hub built in, and that's it. There's no extra cost been frittered away on built-in speakers that you'll never use or component SCART connectors for that matter...

During testing, the SyncMaster 305t showed outstanding results in our monitor test. The panel was able to differentiate 254 levels of grey, DVD high-speed playback was crisp and correct and the colour and lighting over the entire panel is even and clean. There's nothing not to like about it.

Control for the image of the screen is minimal. The only control on the screen is a brightness adjustment, though a software package allows changing of colour profiles and other functionality most appreciated by designers. (This is a minor annoyance, but digging up a disc for your monitor every time you re-install just smacks of 1993.)

Nick Race



CONTACT Samsung
ONLINE www.samsung.com.au
MARKET Performance enthusiast
PRICE \$2,499

✓ Extremely good-quality image.

VERDICT ★★★★★

✗ Little direct control of the screen.



Canon PIXMA iP5300

This five-ink printer brings you photo mastery.

Most people buy an inkjet printer to print documents and photos, but they're either four-ink printers without colour space for photo realism, or they're six-ink printers which are too expensive for document printing — and have the added disadvantage of outputting greyish-black text. The PIXMA iP5300 solves the problem with its five-ink line-up of both pigment and dye-based black inks.

Relying primarily on the pigment-based black tank, mono print speeds are fast at almost 15ppm in standard quality mode and up to 31ppm in the high-speed draft setting. Photo speeds are stunning, with borderless 10 x 15cm prints taking about 20

seconds to output in standard mode. Switching to the highest quality setting and taking advantage of the tremendously high 9,600 x 2,400dpi maximum resolution, we managed to get A4 borderless photo prints in just over a minute, making the Canon around four times faster than most rival models.

Rich black text and colour is available for general documents, but the big surprise is how good the colour rendition is for photos. Despite not being a true six-ink printer, Canon's ContrastPLUS system packs plenty of punch for vibrant colours, while pastel shades are recreated with real sensitivity and skin tones are beautiful.

The iP5300's paper input tray slots in under the printer and holds up to 150 sheets of standard paper. An additional upright input tray hinges out to accommodate a further 150 sheets of specialist media or photo paper. Built-in duplex printing is standard, and accommodates an especially good CD-printing tray. One thing lacking is a media card reader for direct photo printing, instead you have to rely on the PictBridge input for this.

Ink costs are

frugal for photo printing, coming in at 39c per page for 4 x 6in prints using Canon's photo value pack. For speed and sheer versatility, the iP5300 is simply unbeatable.

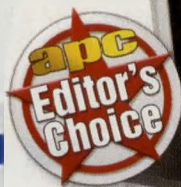
Matthew Richards

CONTACT Canon Australia
ONLINE www.canon.com.au
MARKET Everyone
PRICE \$229

✓ 9,600 x 2,400dpi; 24ppm colour.

VERDICT ★★★★★

✗ No memory card reader.



HP LaserJet P2015

The LaserJet P2015 keeps things simple but effective.

The latest vogue might be for colour lasers in the office but they're usually big, noisy beasts. The new LaserJet P2015 mono printer is an exercise in space-saving simplicity. With an elegant design and simple controls that

boil down to two buttons and a few status indicators, the P2015 looks positively streamlined. In time-honoured LaserJet tradition, fitting the toner cartridge is straightforward, while the main paper input tray — which slides in under the main body of the

printer — feels robust and businesslike, complete with its mechanically-operated paper level gauge, making it easy to see how much paper is left.

As well as the main, 250-sheet input tray, there's an additional 50-sheet multi-purpose tray which is ideal for envelopes. It also comes complete with a slide-out support so full-sized letterhead paper or other specialist A4 media is kept flat and fully supported.

The basic version of the printer is great, utilising instant-on fuser technology for delivering single-page prints in under nine seconds — A4 pages follow on rapidly at up to 26ppm. Graphics are handled speedily, thanks to a 400MHz Motorola ColdFire

processor and 32MB of RAM, upgradeable to 288MB via a single 144-pin DIMM slot. Best quality mode ups the resolution to an impressive 1,200 x 1,200dpi, doing justice to detail.

The basic version includes manual duplex facilities via the printer driver. The next version up, the P2015dn, offers fully automatic duplex. Other models include built-in networking, while the range-topping P2015x includes a second 250-sheet paper input tray. This tray is also available as an optional extra on other models, and running costs are low.

With its speed and ease of use, the P2015 is a chip off the old HP block, while its quiet operation makes it easy to live with.

Matthew Richards



CONTACT HP Australia
ONLINE www.hp.com.au
MARKET Everyone
PRICE \$589

✓ 1,200 x 1,200dpi max; 26ppm.

VERDICT ★★★★★

✗ Manual-only duplex.



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Windows Mobile 6

New features bring this smartphone OS up to date.

Microsoft has encountered two big issues when developing its mobile OS: satisfying the needs of consumers and professionals at the same time, and producing an OS that works well in all three formats supported — smartphones, connected PDAs and unconnected PDAs. It's tried to address both with Windows Mobile 6, while also retaining continuity with Windows Mobile 5.0. The result is more a series of small changes than a big OS development.

It's fair to say that at first glance, versions 5.0 and 6 are largely indistinguishable. It's only when you start to use Windows Mobile 6 that the many changes become apparent. Like its predecessor, Windows Mobile 6 comes in three versions: Windows Mobile 6 Standard is for smartphones; Windows Mobile 6 Professional is for SIM-toting

Pocket PCs; Windows Mobile Classic is for non-SIM-toting Pocket PCs.

For smartphone users, the best news might be that the ability to edit Word and Excel documents comes as standard. Don't get too excited, though: the editing capabilities are minimal and you can't create new documents from scratch. There's a viewer for PowerPoint documents too, and the lot (Word Mobile, Excel Mobile and PowerPoint Mobile) are bundled together as 'Office Mobile'.

More useful on a day-to-day basis are features such as support for HTML email, email-sorting improvements and shortcuts. Keyboard or number pad shortcuts now give you access to email features such as reply, forward and send/receive. Hitting a number

should make handling email a lot faster.

Searching emails is easier too, with a system similar to Windows Mobile smart dial having been implemented. You just go to the inbox, start to type a word and the software narrows down all the emails until only the ones containing your term are shown. HTML email is a boon, with hyperlinks taking you to web pages, or phone numbers in emails being 'live' so you can dial by selecting them.

It's now much easier to use a Windows Mobile 6 device as

a modem thanks to the Internet Sharing utility. You don't need to do any driver download or installation; just making a link between device and notebook computer is enough to get you up and running.

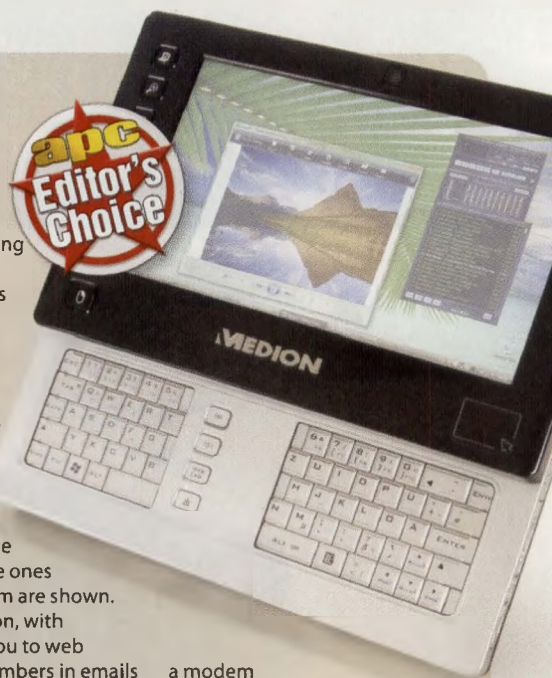
Sandra Vogel

CONTACT Microsoft
ONLINE www.microsoft.com
MARKET Everyone
PRICE Pre-installed on devices

✓ Better email management.

VERDICT ★★★★★

✗ Explorer still unchanged.



Nokia 330 GPS navigator

A quality device let down by a few design flaws.

The problem with Nokia's first GPS navigator is that the in-car mounting arm is too long, magnifying normal road vibration to the point where the device's screen vibrates so much you can't easily follow the display. We asked Nokia if it planned to replace the flexible mounting stalk with a more traditional shorter, rigid stem, and got a disappointing standard line about it being the first they'd heard of it, and that they'd continue to monitor customer feedback.

Its \$649 price also gave us pause, given you can get a functionally similar TomTom ONE for \$449. Again, Nokia gave us a waffly line about Nokia being a trusted brand, and also having an inbuilt music and video player, but

it's hard to get excited about the latter features when the only charger available for it is a car charger — no A/C or USB charger is available. Also, you can't use the MP3 player while navigating, which seems a bit daft. And then there's the complete lack of any mobile phone connectivity including hands-free calling — hello, Nokia?

Complaints aside, the unit works really well — better than we expected for a first-gen device. It's based on Windows CE 5.0 and runs the Route 66 navigation software. You'll be pleased to know it uses Navteq Australia-wide maps — not the Telstra Sensis maps you'll find in most devices. The data is stored on a 512MB mini-SD card. The touch-sensitive display is very responsive,

which is important if you're using the device while driving (the lower-end Navmans suffer from rather unresponsive touchscreens) and there are some dedicated hardware buttons on the right-hand side that assist with returning to the home screen and navigating menus.

We found the unit was quick to lock on to the satellite signal and, while recalculating new routes after a missed turn wasn't as fast as some of the market-leading devices, it was fast enough before we missed the second turn!

The screen is bright and clear, and audio volume is loud enough to be heard even over a noisier motor (it also has a headphone port which could be handy if your car

stereo has line-in). In terms of unit size and weight, it's about average for a flash-based navigator. It's not as compact as the TomTom ONE, but it's still small enough to fit in a shirt pocket.

It's a shame to see such a fundamentally good device marred by the accessory shortfalls mentioned. Our verdict? Wait for a refreshed version addressing these issues before buying.

Dan Warne



CONTACT Nokia
ONLINE www.nokia.com.au
MARKET Everyone
PRICE \$649

✓ Software works well; interface.

VERDICT ★★★★★

✗ Poor car mount; seen it all before.

RedChair Anapod

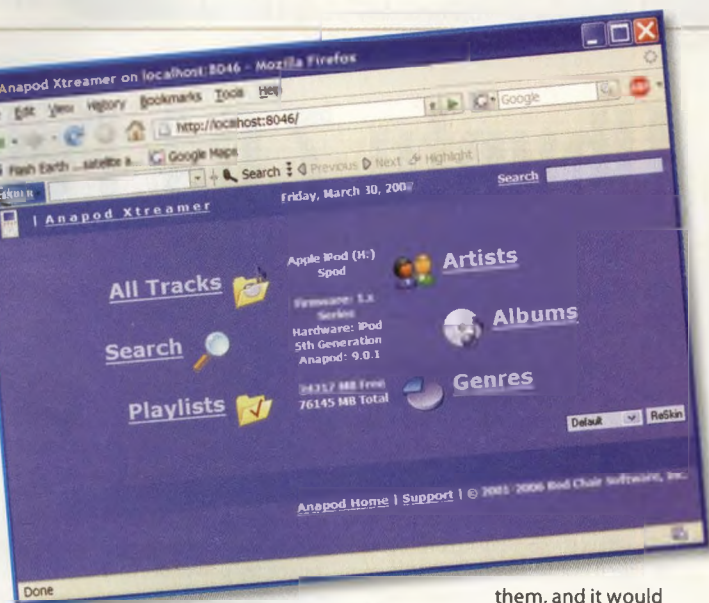
Go far beyond iTunes with Anapod.

Shiny and silver iTunes may be, but it's not everyone's music player. Apple's love-hate relationship with DRM means you can copy files in, but you can't copy them out. And tag management can also be awkward.

RedChair Software has spotted a gap in the market and filled it with Anapod, available in a generic multi-iPod version for \$30, or for \$5 less you can buy a version tied to one particular iPod model. Anapod isn't billed as a music player so much as an iPod file interface. The iPod's filing system is famously obscure and even in disk mode you can't do much to the files it holds. Anapod bridges the gap by adding a translation DLL that makes all of the iPod's files visible within

Windows Explorer. So you can copy music to it, and also copy music from it — which is usually impossible. There are also tag management features, so you can automatically convert a filing system (artist/album/track) into ID tags. Finally, a format conversion tool mangles WMA files — which don't play on an iPod — into compatible MP3s.

Perhaps best of all is a mini http streamer. You can point your browser at a given port — the default is 8046, but you can change this to whatever you want — and an iPod browser window appears that will stream via WinAmp or any other player that can read an m3x playlist. The clever feature here is that it's network-



friendly — you can stream files from a remote PC and even make them accessible over the internet.

On the downside, connectivity can be hit and miss — iTunes and Anapod don't like each other much — and the interface is terse to the point of obscure. Although the format and tag conversion features work as advertised, it's not immediately obvious how to use

them, and it would have been neater to have dialogs appear while copying. But even with those quibbles, the price is a bargain. The ability to stream music from an iPod on your home network and copy files from it (as well as to it) are both worth the admission price on their own. Format conversion and tag management are a useful extra, even if you never use them. Overall, a thumbs up.

Richard Wentk

CONTACT Red Chair
ONLINE www.redchairsoftware.com
MARKET Everyone
PRICE Universal edition, US\$30

✓ Get functionality out of your iPod.
VERDICT ★★★★★
✗ Could be much more user-friendly.

Spyware Doctor 5

A defence against malware, but is it just as efficient?

Windows Vista may be the most secure Windows to date, but it makes sense to look beyond Microsoft's bundled tools to a more complete third party offering. Malware remains a problem, and today we also face the threat of root kits; applications that hide themselves from the operating system and the user on a low level. With the fifth

incarnation of Spyware Doctor, PC Tools is looking to build on its malware-fighting reputation of earlier versions with a rewrite.

Using a new codebase, Spyware Doctor uses seven 'guard' modules to monitor your system for types of malware — from keyloggers to hidden processes. The list of features includes intelliscan, where your registry, memory and other spyware hideouts can be

combed in three minutes. Spyware Doctor 5.0's GUI retains the intuitive look and feel of previous versions, minimising the number of steps to access any program feature. There are no menus present at all in the program. The system tray application uses a minimal amount of system resources with pop-up warnings appearing rarely.

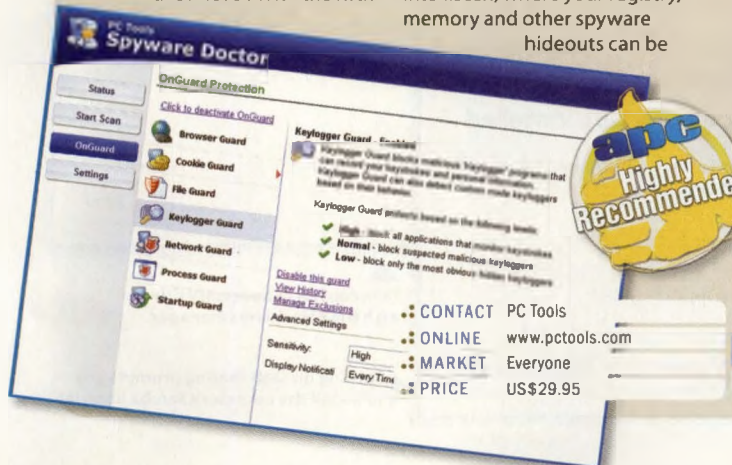
We tested Spyware Doctor with benign applications that mimic malware behaviour, and the software allowed us to make system and registry changes without warning. We then tried some real malware, and Spyware Doctor refused to allow us to open any of these files. This difference in behaviour is because Spyware Doctor tries not

to annoy you with every single system change, but the engine uses both heuristic and signature-based detection to ideally highlight only the malicious changes. This is to keep down the number of false positives: legitimate software that gets incorrectly marked as spyware.

We found this system to be mostly effective, although when we tested against a variety of browser toolbars, it allowed commercial toolbars such as Google's, rejected another, and then allowed one named 'Free XXX search'.

Spyware Doctor removed other spyware programs we threw at it. We would prefer the program to be militant in its malware removal; false negatives are a bigger problem than false positives. This is a fine anti-spyware app, but the redesign needs more polish before it is of similar quality to previous versions.

Orestis Bastounis



CONTACT PC Tools
ONLINE www.pctools.com
MARKET Everyone
PRICE US\$29.95

✓ Good detection and removal.
VERDICT ★★★★★
✗ Needs more polish.



Ubuntu 7.04 Feisty Fawn

Ubuntu's latest offering is the best yet — but has a few niggling issues.

Now more than ever, after the deal between Ubuntu and Dell, it's vital that Ubuntu becomes as complete and polished as possible, because it's going to be the first hands-on introduction to Linux that many Windows users will have. So the good news is that this latest release is, most definitely, the best Ubuntu yet. The bad news is that it still suffers some niggling problems inherited from its predecessors.

The first problem encountered was during install — the new migration wizard, while nifty, wanted to migrate *something*. Electing to bypass this step, seeing as it was a fresh install, caused the migration wizard to bomb out. Thankfully, this didn't prevent the install from completing, and the rest of the affair was simple and clean like previous Ubuntu installs.

While not applicable to every system, our wide-screen testbed machine was greeted with an incorrect desktop resolution. Unfortunately, this couldn't be adjusted manually — the native resolution of 1,920 x 1,200 wasn't an option. This is an issue that's been inherited from previous generations and still hasn't been addressed. For the distribution that will soon be the shining example to the unwashed masses, this isn't a good start. Jumping to the command line and nanoing Xconf to add the resolution to the modelines worked — but that's not exactly user-friendly.

With this bugbear still around we were worried other issues might be inherited as well, such as applications running with the wrong permissions, but happily this isn't the case. And, in fact, a great deal of attention has been paid to make Ubuntu 7.04 'easy to use' — first and foremost it now prompts you for necessary files you need to activate a feature. For example, electing to turn on SMB sharing prompts you to install the necessary Samba libraries. Similarly, when activating Ubuntu's new Desktop Effects, the user is prompted to install the official Nvidia drivers through the new Protected Drivers manager to handle proprietary drivers (currently listed just as Nvidia

CONTACT Ubuntu
ONLINE www.ubuntu.com
MARKET Everyone
PRICE Free

for our configuration). This is an excellent change and it manages to take one more hassle out of using essential features.

And on that note, Desktop Effects is a superb introduction to the snazzy power of Compiz and accelerated 3D desktops under Linux. Wobbly windows, the desktop cube, transparencies and more are all at the click of a button — it can be enabled and disabled on the fly. A job well done for Ubuntu here. Naturally, and wisely, this feature defaults to disabled — it's still in development and a little unstable, but overall fully useable.

The prompted installs work also for media playback; Totem will ask you to install the codecs it needs, for example. Unfortunately, this still doesn't include DVD playback (which, as we covered before, is

✓ More polished than previous release.

VERDICT ★★★★★

✗ Still issues that need to be fixed.

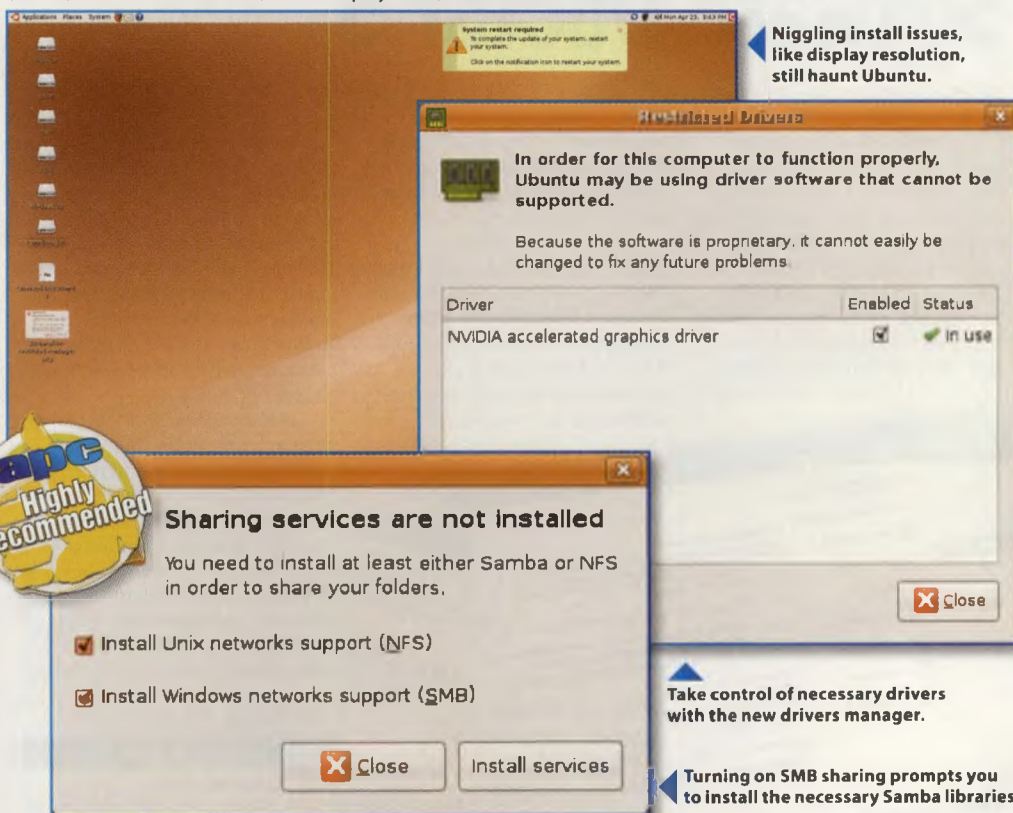
thanks to the DMCA and the inability to legally distribute libraries based off the DeCSS code, even if it's used globally in Linux-powered media devices). However, here, Ubuntu just leaves the user hanging — no explanation as to why DVD playback doesn't and won't work. Again, for the new frontier of being the 'Linux OS' on Dell machines, this is going to leave many scratching their heads.

The software catalogue is, as usual, excellent and easy to browse, and packed with just about any application a user is likely to need (and is something Windows users making the migration can get excited about). All the essential applications come with the install CD — Firefox for browsing, OpenOffice for productivity, Evolution for email, Totem for media playback (not the best choice, but it

works), GAIM (now known as Pidgin) for IM, GIMP for graphics of course, and even Ekiga for VoIP. The kernel is based on 2.6.20. Finally, there's even new art with desktop backgrounds and icons in Ubuntu 7.04 and, although a small touch, it adds a lot of polish to the interface.

Overall, it's hard not to argue that Ubuntu 7.04 is a great successor to 6.10, and maybe we're being overly harsh because of the Dell deal and where it places Ubuntu in the open view of the world, but there are some niggling issues that still need to be solved, and something as large as display problems really shouldn't exist for Linux today — especially when Windows makes it so easy. Ubuntu is almost there as a shining example of an excellent Linux desktop to replace Windows, if only for a little more attention to detail and emphasis on getting core functions right before adding more features. Here's looking forward to Ubuntu 7.10.

Ashton Mills





MSI
MICRO-STAR INTERNATIONAL

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Longhorn Server beta 3 Terminal Services

Over the past few months we've looked at several features of the upcoming Windows Server, codenamed Longhorn. This time, *Paul Schnackenburg* takes the grand tour of Longhorn's Terminal Services and finds several enhancements.

Many businesses use Terminal Services to simplify administration and increase security. By hosting the user's desktop on a central server, IT can maintain much stricter control over the user's OS, applications and data.

The three biggest new features of Terminal Services (TS) in Longhorn are Remote Apps, TS Gateway and TS Web Access. Remote Apps lets you run a single program hosted on a TS server that appears on the clients as a normal, locally installed program. The programs that are available for each user can be controlled via Group Policy. TS Gateway tunnels TS traffic

over HTTPS; this enables a seamless transition for Remote Desktop and Remote Apps connections for users. When the laptop is in the office and the user starts a session, it's connected to the TS server via the LAN. If the laptop is outside the corporate network but has access to the internet, an SSL connection is made to the Longhorn TS server and the session is started.

TS Web Access presents a web page for internal or external access where authorised users can start a remote program or desktop session simply by clicking on an icon.

Enhancements to existing features include higher screen

INSIDE INFO

Longhorn beta 3 technical overview:
www.microsoft.com/technet/windowsserver/longhorn/default.aspx.

Terminal Services in Longhorn
Server: www.microsoft.com/

windowsserver/longhorn/terminal-services/default.mspx.
RDC 6.0 download for XP and Windows Server 2003 (both 32- and 64-bit): <http://support.microsoft.com/kb/925876>.

resolutions and monitor spanning. Security also gets an overhaul with Network Level Authentication, which doesn't actually start the session on the server until logon is completed. Printing should also be a smoother experience with the new Easy Print universal driver.

REMOTE APPS

One of the biggest ongoing costs with a Windows network is keeping applications running. Conflicts between applications and the necessary testing needed before large-scale deployments are well known. Some time ago, Microsoft acquired a company called Softricity and some of its technology has made it into this new feature of TS, Remote Apps (called Remote Programs in beta 2). Rather than running a complete desktop hosted on a TS server, a single program is accessed. Moreover, this program appears as a local program to the user, including displaying any messages in the system tray.

It can also be started from a Start menu shortcut, so users might not even realise that they're running a remote program rather than a locally installed one.

If a user starts several programs that are located on the same TS server, they're hosted in the same session rather than a new one for each program.

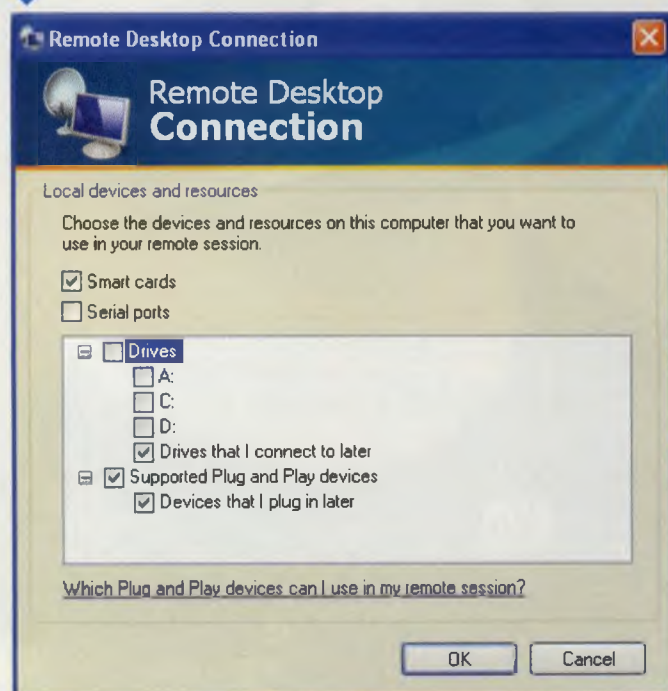
If you combine Remote Apps with TS Web access, you get the perfect setup for remote users, personalised exactly to which applications they should be able to access (through Group Policy/Active Directory). Not all applications installed on a TS server are automatically available through Remote Apps; there's an allow list that the administrator configures. Once on that list, an RDP or MSI (Microsoft Installer) file 'linking' to the program has to be created; these files then need to be distributed to users. MSI packages are more flexible than RDP files, as they can be deployed with Group Policy software distribution. The MSI option also allows the setup of desktop and/or start menu shortcuts and the association of file extensions with a remote program. In other words, if you don't have Word installed locally and you double-click a .doc file, Word Remote starts and opens it for you.

One caveat is that Remote Apps only works with Longhorn/Vista, Windows XP SP2 and Windows Server 2003.

TS GATEWAY AND TS WEB ACCESS

TS Gateway is going to be a hit with users and administrators alike. No more messy client VPN connections just to be able to run a program remotely. Because it uses SSL traffic over port 443, both firewall and

It's very easy to configure an application for Remote Apps.



Network Address Translation issues should also be a thing of the past. TS Gateway tunnels RDP traffic within HTTPS for a secure connection over the internet from client to TS server.

TS Web Access is a secure web page that enables access to internal TS servers.

Administrators have total, granular control with Connection Authorisation Policies (CAP) that determine who has access, based on group membership, computer group membership etc. You can also require smart cards for logons. Once authenticated, Resource Authorisation Policies (RAP) define which internal resources are available to users.

The other benefit TS Web Access has over VPN connections is that the administrator can keep a close reign over what resources a remote user can access.

TS Gateway can route sessions to any TS-capable OS, including Windows XP (Remote Desktop). Be aware that TS Gateway requires a Network Policy Server (NPS), Microsoft's implementation of a RADIUS server. Normally, this role is associated with Network Access Protection in Longhorn. If you don't have one in your network, it's automatically installed in local mode when TS Gateway is added to the server. This also means that you can set a minimum level of Antivirus, Windows Firewall and patching level for a computer to be allowed to connect via TS Gateway. As TS Gateway (and TS Web Access) relies on SSL/TLS, a digital certificate is necessary. If your company has an in-house Public Key Infrastructure (PKI), this can be used. Another option is to purchase a certificate from a third party Certificate Authority. TS Gateway also allows the use of a self-signed certificate, but it must be manually installed on every client computer.

The client side of a TS Gateway connection is configured in an RDP file on the Advanced tab; it's called Connect from Anywhere. This is capable of detecting whether it's on the local LAN, in which case TS Gateway isn't used, or if it's connecting over the internet, in which case TS Gateway is used.

We can't help but notice that a similar feature to TS Web Access — called Remote Web Workplace — is already available in Small Business Server 2003. Another feature from



A web page with customised Remote Desktop and Remote Apps access, just for you.

With Network Level Authentication, only Vista and Longhorn can come to the party.

the country cousin makes it into the big boys' league! The TS Web Access includes a customisable Web Part which can be hosted on any web page or even in a SharePoint site.

MINE IS BIGGER THAN YOURS

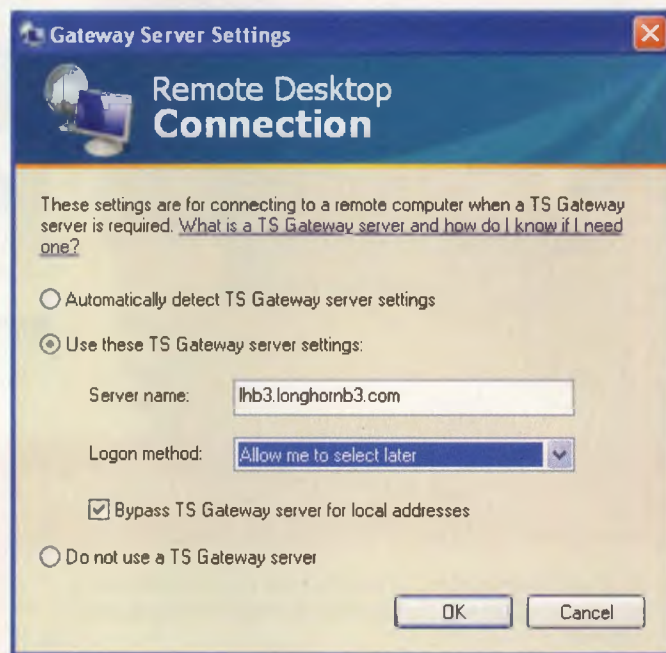
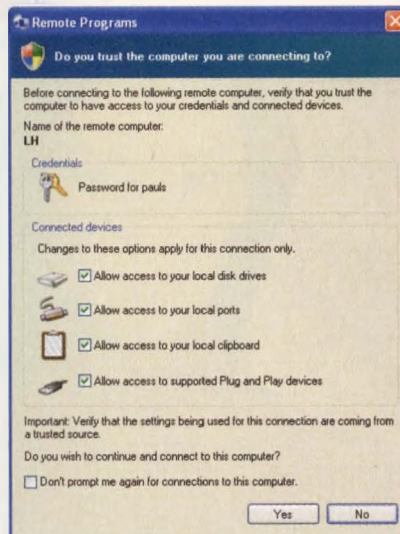
Users are expecting larger, wide-screen monitors with higher resolutions these days, but Terminal Services sessions in Windows Server 2003 are limited to 1,600 x 1,200 and a 4:3 aspect ratio.

If you have a fast connection, the new TS supports a maximum resolution of 4,096 x 2,048, along with ratios such as 16:9 and 16:10 (1,920 x 1,200 comes to mind). TS sessions can now also span multiple monitors, as long as the resolution on both screens is the same.

Longhorn supports ClearType, also known as Font Smoothing, which can now be extended to TS sessions. It does make it easier to read text on LCD monitors.

In a TS session, the most important user experience issue is refresh rate, and Longhorn deals with this by way of Display Data Prioritisation. Higher bandwidth is allocated to display

When running, a Remote App looks like a normal program.



and input data (by default 70%), with print jobs and file transfers allocated the remaining 30%. These values can be altered by an administrator.

EASE OF USE

USB devices get stronger support with Plug-and-Play redirection, which now includes digital cameras using Picture Transfer Protocol (PTP). Redirection is a function in TS which make local resources appear in your TS Session. For instance, a

locally connected printer will appear in your TS session so that you can print. The new PTP support means that you can plug a digital camera into a USB port and have it appear in a Remote Desktop session, rather than in the host OS. We tested a Canon Ixus 55 which worked just fine.

Be aware that Plug-and-Play device redirection (flash sticks, removable HDDs and the like) only works from client to server, not through cascaded



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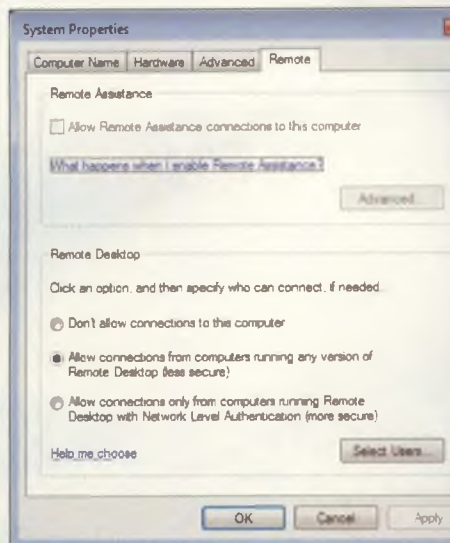
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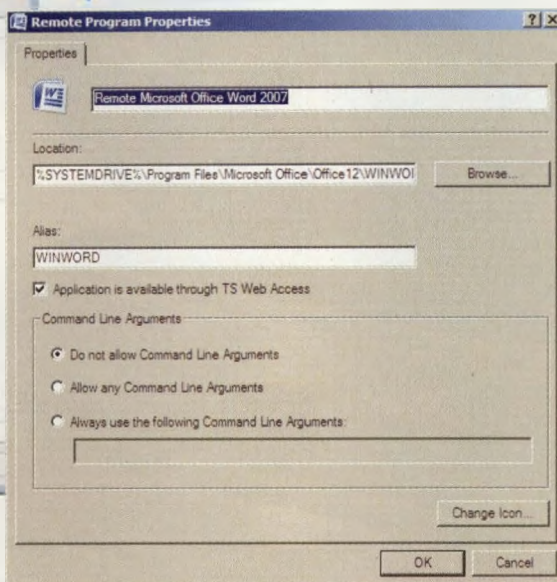
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A digital certificate is necessary for TS Gateway.

It's easy to set up Anywhere Access on the client side.



connections. If you're connected to a TS server and open a second connection to another server from within the session, Plug-and-Play redirection doesn't work for the second session. A client with support for the new version of the Remote Desktop Protocol 6.0 (RDP) is built into Windows Vista and Longhorn Server and is also available for Windows Server 2003 SP1+ and Windows XP SP2+ as a free download. Version 6 is required for many of the new features in TS.

Single sign-on (Vista only) is another feature that's sure to please users — the supplied username and password used to log on to the PC in the morning is also used for TS sessions logons.

Printing in TS can cause headaches. The new Easy Print

universal driver should give more reliable printing, especially from Remote App sessions. There's also an option to only redirect the user's local default printer, rather than all available printers. This should lighten the load on the TS print spooler. Overall, small changes behind the scenes should improve users' experiences, as well as make life easier for administrators.

HOW SECURE IS YOUR TERMINAL?

Security enhancements to TS include Network Level Authentication (NLA): a Longhorn TS can be configured to only accept connections from NLA-capable clients. Be aware that the RDC 6.0 client for Windows XP and Windows Server 2003 doesn't support NLA, effectively limiting access to Vista and Longhorn only.

The big plus with NLA is that it doesn't create the session on the server until authentication has successfully taken place.

WANT THE VISTA EXPERIENCE REMOTELY?

With the Desktop Experience feature installed on the Longhorn server, clients that match the requirements for Vista can have TS sessions that look and feel like Vista Basic. In beta 2, Aero Glass could be enabled as long as the client's graphics card was up to it. However, from beta 3 onwards only one client can connect and use Aero Glass — all others will be rejected. According to Microsoft, there are issues with having multiple clients using Aero Glass simultaneously. The standard Vista interface works fine from multiple clients.

BIG IRON

Running a well-behaved TS server is a bit of an art. It's a server that works like multiple desktops for many simultaneous users. To balance the load between users, Longhorn Server offers Windows System Resource Manager (WSRM). It has Terminal Services-specific resource allocations; new in Longhorn is Equal_Per_Session, which divides CPU resources between user sessions and associated processes equally.

THE FUTURE IS BRIGHT?

There's no doubt that PCs are expensive business tools. Keeping servers and clients running with help desk and associated costs results in an overall Total Cost of Ownership (TCO) that takes a huge chunk of businesses budgets in businesses.

There's also no doubt that the PC has brought unprecedented levels of productivity to both small and big businesses. Going forward, we suspect there will be a gradual transition to fewer programs installed locally and more resources stored centrally.

In some situations, this could be a thin client with very little software locally; in others, a PC with a mix of local and remote programs. Citrix is Microsoft's major competition (as well as partner) in the Terminal Services space. One powerful Citrix feature is Published Applications. For the first time, Microsoft now has a comparable feature built into Windows Server: Remote Apps.

Overall, the new TS functionality in Longhorn provides for all terminal service scenarios in a more competent way than its predecessor. Mobile users should also be pleased with the new functionality.

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NOTEBOOK SHOOTOUT

William Maher puts 13 big brands through our gruelling Labs test in the search for the ultimate all-purpose notebook. Is there a notebook that gives you battery life and performance?



THE players

13
TESTED

One of the big questions for anyone buying a new notebook in 2007 is how it will perform under Windows Vista. The OS needs more grunt than the ageing XP, and, as we've already demonstrated in our previous tests, there's a big trade-off between notebook processing power and battery life.

So is there a notebook that gives you both? Our goal was to find which coped best under Vista, and importantly, which had the best combination of power and battery life. We wanted all-purpose notebooks aimed at students, the home, or even business users; the kind that can cope with serious multi-tasking, with enough battery life to make it a decent portable, not just a desktop replacement. We weren't specifically interested in media centre

VENDOR	MODEL	PRICE	ONLINE
1. Toshiba	Satellite A200	\$2,299	www.toshiba.com.au
2. Excel	M665N	\$1,899	www.protac.com.au
3. Thinkpad	T60	\$2,600	www.lenovo.com.au
4. Lenovo	3000 N100	\$2,500	www.lenovo.com.au
5. Dell	Inspiron 640M	\$2,399	www.dell.com.au
6. Sony	VAIO VGN-FE45G/W	\$2,299	www.sony.com.au
7. Acer	Aspire 9425	\$2,499	www.acer.com.au
8. BenQ	Joybook S73VG V04	\$2,299	www.benq.com.au
9. HP	Compaq NX9420	\$2,999	www.hp.com.au
10. Toshiba	Satellite P200	\$2,799	www.toshiba.com.au
11. Pioneer	M57U	\$2,999	www.pioneercomputers.com.au
12. Fujitsu	Lifebook S6311	\$2,499	www.lifebook.com.au
13. BenQ	Joybook S31V V7	\$1,999	www.benq.com.au



Our goal: to find which notebook coped best under Vista, and, importantly, which had the best combination of power and battery life.



notebooks, though some of the notebooks do have reasonable qualifications in that area (for example, the Toshibas with their Harmon Kardon speakers).

Vendors were invited to submit two notebooks running Vista and priced at less than \$3,000. Interestingly, although we've seen notebooks as low as \$700-\$800 advertised with Vista, some vendors such as Acer are publicly shying away from going this cheap, with a spokesperson arguing, "You're not getting a good

customer experience. You're artificially hobbling the notebook to look good in a catalogue," at a recent product launch. Most vendors officially recommend Vista with new notebooks, although at the time of writing XP was still being listed as an option on the web sites of Pioneer, Dell, Fujitsu, Lenovo and others.

What we got was a real mix: everything from portables you could slip in your bag for a train trip, to 17in clunkers that would do nicely as a workstation for home.

Amidst the different approaches though, there was a common theme — dual-core across the board, and no less than 1GB of RAM. There were no ultra low-voltage CPUs, no systems without a DVD drive (hello ultraportables), no Blu-ray drives with whopping screens, and perhaps most interestingly, no AMD. Every system ran Intel's Core 2 Duo.

The good news is that several models shone in our gruelling CPU/battery tests. And looks can deceive, with one of the bigger,

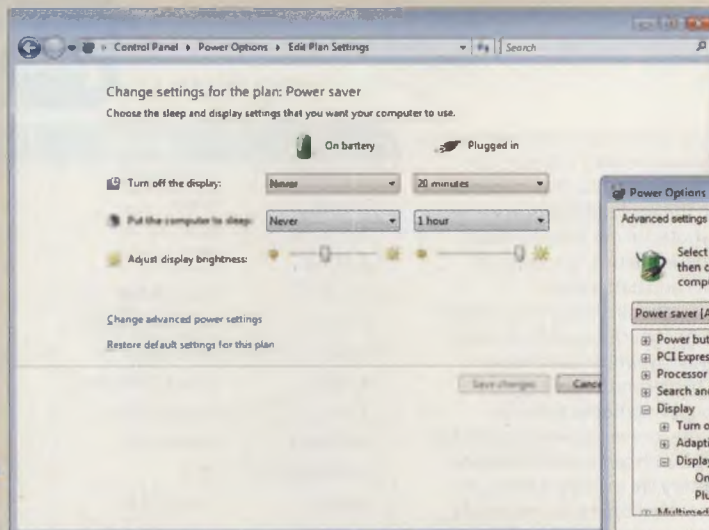
reasonably powerful notebooks turning in an equally impressive battery performance, belying the myth that larger, powerful notebooks always have poor battery life.

Note: by the time you read this, Intel's upgraded Centrino platform should be on shelves with a new CPU, 802.11n networking and improved integrated graphics. The notebooks here will still be good buys, but if you are curious about what's ahead, check out our 'First Test' on page 32.

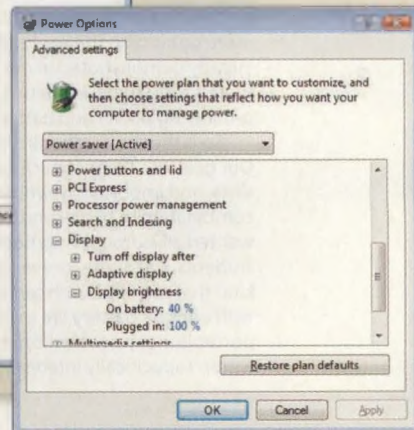
TIP SAVE YOUR BATTERIES

Display-brightness settings under Vista's power plans provide drastically different results with different notebooks. In our tests we set them all to 40 per cent, but some screens were much brighter than others — and likely suffered a battery hit for it. If you're really trying to conserve batteries, we'd recommend you manually adjust screen brightness using the Fn key.

Choose your display brightness in this main battery options screen.



Advanced settings like auto-display shutdown help squeeze extra juice.





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UNDER THE HOOD

On paper, the basic powerplant didn't change much. As mentioned, it was Intel's Core 2 Duo across the board, with no less than seven systems including the 2GHz T7200 chip and the T5000 series chip for the others. Systems ranged from 1GB to 2GB RAM — 2GB is definitely recommended, though as you'll see later, 1GB systems can cut the mustard in the right configuration.

As always, the major difference came with graphics. The majority of systems could be divided into two camps — dedicated vs. onboard graphics. Almost three quarters of the systems packed dedicated graphics, including the Pioneer, which blew us away in the 3D performance tests with its GeForce Go 7900GTX (more on that later).

Nothing else matched the 7900, but in the Nvidia camp there was also the Sony and the Toshiba P200 with GeForce Go 7600s, and sporting 7300 graphics was the Acer, Toshiba A200 and Lenovo 3000. In the ATI camp was BenQ's S73VG and the HP, with Mobility Radeon X1600. Just to be different, the Thinkpad packed a Mobility Radeon X1400.

Most of the systems here weren't remotely far apart in terms of hardware spec, though there were some standouts on paper. Both Toshiba's really piled on the extras, with a full complement of PC card, ExpressCard and memory card readers, plus webcams and fingerprint readers. Take a look at the Toshiba P200 in particular: Intel's T7200 CPU, 2GB RAM, a whopping 200GB hard drive (the biggest in this line-up) and GeForce Go 7600 for a



THE GOOD NEWS IS THAT SEVERAL MODELS SHONE IN OUR GRUELLING CPU/BATTERY TESTS

strong graphics punch. The standout, though, was this unit's (and the other Toshiba's) 802.11n wireless 'Kedron' module. These were the only notebooks in the line-up with 802.11n wireless, something you'll see more of over the year, especially as Santa Rosa notebooks hit the shelves.

The Acer impressed with its solid combination of Intel's T7200 chip, 2GB RAM and GeForce Go 7300. In just about all other areas, this unit was near the top of the competition — four USB ports, a 160GB hard drive, a large 8-cell battery (versus 6-cell for most of the others), memory card and PC card slots (though no ExpressCard) and a webcam.

The HP was also respectable, with Intel's T7200 CPU, 120GB hard drive, ATI Mobility Radeon X1600, 8-cell battery, PC card and memory card reader. Mind you, at \$2,999, it's one of the most expensive notebooks here.

DESIGN

It's easy to forget about the look and size of a notebook on paper, but this really should be a factor when you're choosing a system. In our line-up, the systems ranged from big hulking 17in models you wouldn't want to drag far, to an ultraportable perfect for train trips, but possibly not the best for hours of spreadsheet work. At the heavier end of the scale were



HOW WE TESTED

Before testing we updated all notebooks using Windows Update and any third party services from the notebook manufacturer. Any third party antivirus programs were removed and the Windows sidebar was closed. We then tested each machine using 3DMark06, and PCMark05. General responsiveness was tested while running multiple applications (see main text).

Before battery testing we turned off wireless networking and set the power plan to 'Power Saver'. We then opened the Power Saver options, and disabled the screen-off and computer-sleep settings. Then we opened the advanced settings and under 'Sleep' we turned off sleep and hibernation. Under 'Display' we checked that the display would not be turned off and disabled adaptive display. Under 'CPU' we turned minimum CPU power to 5% and maximum to 50%. Under 'Battery' we turned low battery level to 5% and critical level to 0%. We adjusted screen brightness to 40%. The Windows audio volume was set to zero so we wouldn't go crackers. Battery levels were tested by playing a DVD and timing how long it took before the batteries ran out.



My eyes! The Toshiba A200's futuristic silver keyboard stands out a mile, but is also a pain to type on.



Ah Sony, how can we be mad at you? Actually we can — this Vaio keyboard looks sleek, but our Guinness Book of Record typing record was shattered.

the HP, Pioneer, Acer and Toshiba P200, all 17in machines weighing more than 3kg. The Pioneer and Acer in particular were heavy, tipping the 3.8kg mark — a bit like dragging a lead weight around.

If it's portability you're after then you should look at the bunch of contenders in the middle-weight category. The Sony and the Excel are still sizeable machines with large keyboards, but feel lighter than the Acer and HP. Then there's the BenQ S73VG, which has a 14.1in screen and is quite compact.

In terms of sheer portability, look at the BenQ S31V, Thinkpad and the Dell. The Dell and BenQ are both noticeably more compact than 15.4in notebooks like the Toshiba A200. The Thinkpad, while slightly heavier, still managed to provide a decent-sized keyboard and screen without feeling like a lead weight. The tiny 1.7kg Fujitsu was by far the smallest, both in desktop real estate and weight, though, as you'll see later, it's not the most powerful machine.

Watch out for wacky keyboards — hello Sony, we're looking at you. Kudos to the Vaio team for designing a keyboard that has a minimalist, white 2001: A Space Odyssey-esque look, but it's not an easy thing to

bash away on. The Vaio's keys feel like there's less of a gap between them and the edge of the key drops straight down instead of at an angle, leaving you with less room to feel your way between the keys.

The surprise was the Toshiba: what were they thinking? The overall notebook design is very slick, but somewhere along the line someone got a bit too clever with the keyboard. The plastic is silver with a texture and it has a really smooth feel, like your finger is about to slide off. Also, when you start bashing away, the whole keyboard starts bending very slightly with the impact. It's not a big deal, but it's not

the same feel you get from a 'normal' keyboard. Give it a quick test before you buy.

As far as keyboards go, our trophy goes to the very clicky, very '80s Lenovo and Thinkpad. They're not going to win fashion awards, but these standard black keyboards are much easier to use in our opinion.

We're in two minds over screens, which fall into the glossy or matte (non-glossy) categories. To our taste, the glossy screens have an impressive shine, but often need fine tuning because the contrast is too heavy. For example, on our BenQ S31V test model, the picture seemed too dark while watching DVDs.

Notebooks like the Acer, HP, Lenovo and Thinkpad had matte screens which we found easier on the eyes.

PERFORMANCE

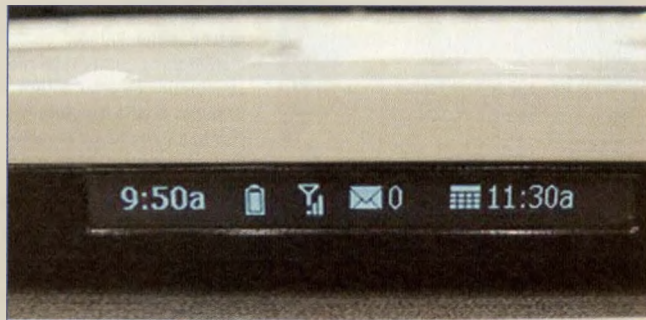
The good news is that all the notebooks here will handle Vista. The big question is which cope when you start opening lots of application tabs — and have decent battery life at the same time?

The notebooks with dedicated graphics stormed home in our benchmarks. The standouts were the Acer, Sony, BenQ S73V, Toshiba P200, Lenovo and the HP. Then there was the Pioneer's result — so ridiculously high we almost thought

NEW FEATURE

SIDESHOW DISPLAY

The SideShow display is a small readout on the outside shell of the notebook case, showing power levels, incoming mail and current time (as seen here in the Toshiba Portege R400). While none of our test models featured the SideShow display, it's one of the fancier things being introduced with Vista notebooks. Mind you, not everyone's jumping for it, with Acer saying SideShow was not part of their design at time of writing.





BATTERY RESULTS

Model	Time
Acer Aspire 9425	2hr 34min
Protac/Excel	1hr 33min
Sony VAIO VGN-FE45G/W	1hr 44min
Benq S31V	2hr 22min
Benq S73V	1hr 32min
Fujitsu S Series	2hr 27min
HP	2hr 38min
Dell	2hr 44min
Toshiba Satellite P200 (bigger)	1hr 33min
Toshiba Satellite A200 (smaller)	2hr 3min
Lenovo 3000	1hr 55min
Thinkpad T60	2hr 23min
Pioneer	1hr 37min

it was a typo. Get this: a 3DMark score of 4,429, versus less than 2,000 for the closest competitor. Most struggled to hit 1,000.

More interesting was whether the notebooks with standard Intel integrated graphics coped with Vista under load. To test this we opened up several windows, including Control Panel, Device

Manager, at least four or five browser tabs, Explorer, as well as playing a DVD in either Windows Media Player or WinDVD. We then tested the responsiveness while alt-tabbing between applications and browser tabs.

While all systems coped, some showed the strain more than others. DVD playback became

noticeably jerky on the smaller Benq S31v with 1GB RAM when switching between apps, though it smoothed out once we left the machine alone. On the other hand, the Dell showed the benefits of 2GB of RAM. It struggled a bit under heavy load, but DVD playback was fine without any jitter — definitely better than the BenQ.

PERFORMANCE RESULTS

Model	3DMark06	PCMark05
Acer Aspire 9425	626	4,248
Protac/Excel	218	3,039
Sony VAIO VGN-FE45G/W	1,517	4,494
Benq S31V	157	3,051
Benq S73V	1,823	4,348
Fujitsu S Series	245	3,118
Toshiba Satellite P200 (bigger)	1,304	4,437
Toshiba Satellite A200 (smaller)	612	3,668
Lenovo 3000	471	3,322
Thinkpad T60	894	4,368
HP	1,260	4,147
Dell Inspiron	220	3,354
Pioneer	4,429	3,807

Interestingly, while the extra GB of RAM obviously makes a difference, our tests show that it's not necessarily a must for a decently performing machine. Take a look at the HP, which has 1GB RAM and managed to pass all our useability tests without the same jittering as the previously mentioned machines. In our benchmarks it posted a 4,000+ PCMark score, which was better than six rivals and not far off the leaders.

BATTERY LIFE

There's no escaping the fact that the battery on your notebook still mightn't last on a long train trip or plane flight, especially if you're watching a DVD.

We tested these notebooks by disabling wireless networking, configuring consistent power saving settings (see page 54) and then playing a DVD until the batteries ran out. In some cases we only just cracked the 1.5-hour mark before the machine gave up — not long enough to get through some DVDs.

The best and worst performers were roughly divided into two groups — those with dedicated graphics and those without. As is

What's ahead: Intel ups its game

Intel updates its integrated graphics solution with the Mobile 965 Express chipset. Has GMA X3100 got the look?

As you may know, integrated graphics aren't focused on insane fill rates, huge memory throughputs or generally pitching as much silicon at the 3D pipeline as possible. They're more about offering a reasonable feature-set in a limited amount of space for the

everyman. As a subset of this market, mobile integrated graphics are even more focused, having to take into account thermal design power (TDP) on top of the other design constraints, while accepting that there probably isn't a discrete upgrade path available.

Unquestionably due to its position in the marketplace, rather than the capabilities on offer, Intel's Graphics Media Accelerators (GMA) can be found in more laptops than any other manufacturers' chipsets.

With hardware T&L, the GMA X3100 easily doubles the last generation's 3DMark score.

The latest revamp to the Centrino chipset, previously codenamed Santa Rosa, also ushers in a new graphics engine, but should end users, and ultimately laptop builders, be looking elsewhere for their graphics engines? Or is there just enough on offer here to keep its intended market placated?

Before we discuss the merits and deficiencies of Intel's latest, it's worth putting the capabilities of this chipset into the context of who they're designed for, and that's essentially the casual gamer. If you're looking to play modern titles such as Bioshock or Unreal Tournament 2007, then you really need to invest in a proper discrete graphics solution. Integrated graphics are aimed more at the likes of World of Warcraft or older, last-generation games such as Doom 3.

The biggest news about Intel's new GMA X3100 is that it supports hardware Transform and Lighting (T&L) and programmable shader units (up to 128). The engine runs on a 500MHz clock, boasts Intel Clear Video Technology (which improves quality), supports Vista's Aero prettiness and can potentially output to an HDMI connector as well. API support comes in the form of DirectX 9 and OpenGL 1.5. This, combined with improved power-saving states, make this one of the most significant updates in recent times.

IN THE FRAME

The GMA X3100 also continues the philosophy of Intel's previous graphics solutions (going back as far as its discrete i740 line), and that is one of ▶

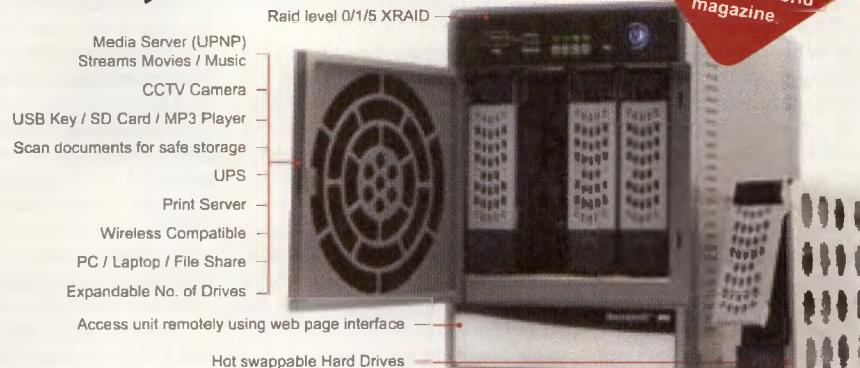


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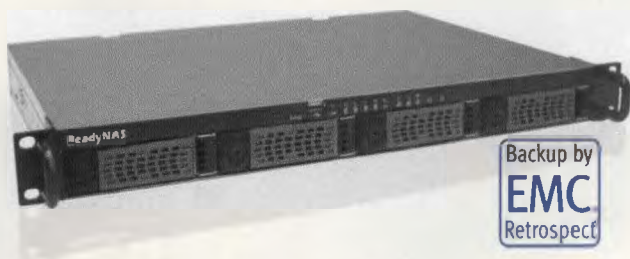
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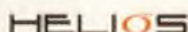


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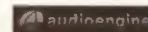
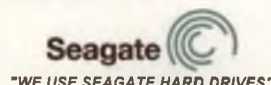
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Z500 Series





normally the case, the group with integrated-only graphics chewed less power and survived longer.

The best performer? The Dell managed the top time of two hours, 44 minutes, just edging out the HP (two hours, 38 minutes) and the Acer (two hours, 34 minutes). At the bottom of the ladder was the BenQ573V at one hour, 32 minutes.

Testing showed that the dedicated-versus-integrated graphics rule isn't everything though. There were a few anomalies, including the Acer, which managed to last 2.5 hours with its GeForce Go 7300. The HP also shone despite the ATI x1600 inside, managing second place behind the Dell.

On the flipside was the Excel, with a mid-sized 15.4in screen and integrated graphics — on paper it looked promising. Tests were a different story. The Excel clocked up only one hour, 36 minutes in our DVD rundown test. Keep in mind the unit has a 6-cell battery instead of eight like some of the others, which helps keep the weight down.

Then there's the Pioneer — a fantastic piece of technology, with classy front-side volume controls

and thumping 3D performance that blew every other machine away. But in our battery test, it only just cracked the 1.5-hour mark before giving up the ghost. It's a good example of the type of power that you'll appreciate under Vista — but if you need portability look elsewhere.

VERDICT

We had a number of favourites, all with their own specialties. The Acer and HP were outstanding performers with solid processing power, 3D performance and excellent battery life. The HP thumped it home in all our tests — one of the few systems to manage both cracking performance results and lasting ages on the battery. But both notebooks are big and heavy. If you won't be transporting your notebook much then the HP is a top buy, but it's just not very portable so it doesn't get our Editor's Choice.

A more compact all-round package is the Dell. It beat all of its rivals in our battery tests, easily enough to crank out a full DVD with time left over for work. The 14.1in screen isn't too small, and the 2.4kg is reasonably light, and you get a 160GB hard drive all for \$2,399. The

system is only let down by its 3D performance. It's a good buy, but not the best.

More impressive was the smaller of the two Toshibas, the A200. Its 3D performance was average, though better than the Dell, and battery life and benchmarks results beat the Dell on all counts. You get all the goodies like webcams and fingerprint readers, a faster processor, bigger screen, 802.11n networking (you'll need an 802.11n base station) and, at the time of writing, it was cheaper than the Dell. It's bulkier than the Dell, but still slightly smaller than its 17in rivals. If you're looking for a portable system, then our money would go on this, rather than the P200, HP or Acer.

The dark horse, drum roll please... was the unassuming T60. This serious-looking, no-nonsense business notebook managed to place near the top of the ladder in battery life and PCMark, and only a

bit off the pace in 3DMark. The Radeon X1400 was obviously a good compromise between 3D grunt and saving power, scoring close to the 1,000 mark in 3DMark, beating the A200 and the Dell. The spec sheet didn't amaze us, with 1GB RAM and a 100GB drive, and in this area it falls short of more consumer-friendly systems like the A200. Still, this is perhaps the best of the reasonably compact systems (that don't weigh a tonne like the 17in models).

In the long run we were torn between the A200 and the T60. The Toshiba is better value; it's got a beefier spec sheet, though we didn't like the keyboard. The T60 is a more compact machine and it has slightly better all-round performance and a better keyboard — it's a better bet for a business user and for plane flights, though for the money we couldn't justify it. The Toshiba gives more bang for your buck and the performance is similar. It's where our money would go, so it gets the Editor's Choice award, though we wish they'd fix the keyboard. **ETC**

◀ compatibility. While there's rarely been the power available to run games at anything more than PowerPoint slideshow speeds, being able to render those images correctly means that you'll often put up with poor frame rates as long as everything looks right.

In testing, the improvement this new engine offers over the older solutions isn't massive — 3DMark06, the industry benchmark for ascertaining the capabilities of graphics engines in general, returned a score of 416. While this result is twice that from the previous generation of integrated graphics, it still proves that integrated graphics aren't for next-generation titles. Top-end cards score around 8,000, with even cheaper cards managing scores around the 4,000 mark.

In real-world performance terms, the low throughput of this engine shows when trying to play Doom 3 back at the high-quality setting at 800 x 600 — less than 10fps isn't playable. Half-Life 2 fared a little better at 18fps, but surprisingly this score is bettered by its last-generation graphics, which were 5fps smoother.

Despite the presence of hardware T&L, the lack of fill rate is clearly a limiting factor.

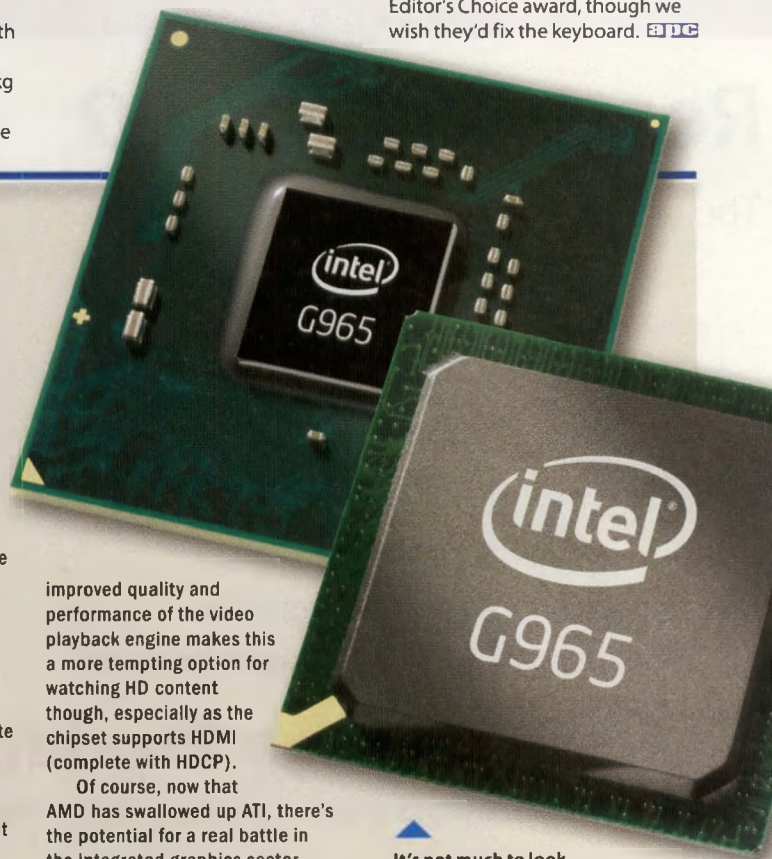
LOOKING BETTER

Newer drivers should improve the performance on offer — somewhat surprisingly, even Windows Vista currently only rates the capabilities of GMA X3100 as a 3.0 in its Gaming Index. The fact that it offers programmable shader units means that the drivers can be tweaked to get the best performance out of individual titles, although whether Intel is prepared to invest so much time and money in something that isn't aimed at gamers is questionable.

The improvements to the video rendering engine are more immediate — video playback is less processor-intensive and actually does look better. Playing back HD content stressed the CPU by only 15 per cent using WMV content, and even the usually punishing H.264 trailer suite we use for testing averaged out at an impressive 40 per cent. Colours were more vibrant and the results weren't so obviously affected by jaggies. The

improved quality and performance of the video playback engine makes this a more tempting option for watching HD content though, especially as the chipset supports HDMI (complete with HDCP).

Of course, now that AMD has swallowed up ATI, there's the potential for a real battle in the integrated graphics sector. Hardware T&L means this chipset is already a couple of inches ahead of ATI's R690, which can't be good news for the newly combined company.



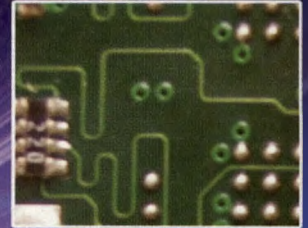
▲ It's not much to look at, but the Mobile 965 chipset offers decent graphics in lower-cost machines.

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CPU (including clock speed)	Intel Core 2 Duo T7200 2GHz	Intel Core 2 Duo T7200 2GHz	Intel Core 2 Duo T5600 1.83GHz	Intel Core 2 Duo T5500 1.66GHz	Intel Core 2 Duo T5600 1.83GHz	Intel Core 2 Duo T5600 1.83GHz
RAM	2GB DDR2	2GB DDR2	1GB DDR2	1GB DDR2	1GB DDR2	2GB DDR2
Chipset	Intel 945GM	Intel 945GM	Intel 945PM	Intel 945GM	Intel 945PM	Intel 945GM
HDD	160GB	120GB	100GB	100GB	120GB	120GB
Optical drive	MediaBay DVD Super-Multi Dual-Layer	DVD+Rewriteable	DVD+-RW/+R Dual-Layer/ RAM	8x DVD Super-Multi Dual-Layer	8x DVD Super-Multi Dual-Layer	DVD Super-Multi (DVD+/-RAM-RW) Dual-Layer
Screen size	17in	15.4in	15.4in	13.3in	14.1in	13.3in
Native resolution	1,440 x 900	1,280 x 800	1,280 x 800	1,280 x 800	1,280 x 800	1,024 x 768
Graphics	Nvidia GeForce Go 7300	Intel 945GM; shared memory architecture up to 224MB; support two displays dual-view	Nvidia GeForce Go 7600	Intel 945GM	ATI Mobility Radeon X1600 (256MB)	Intel 945GM
Wireless	802.11a/b/g; Bluetooth	802.11a/b/g	802.11a/b/g; Bluetooth	802.11a/b/g; Bluetooth	802.11a/b/g; Bluetooth	802.11a/b/g; Bluetooth
Battery	8-cell	6-cell	VGP-BPS2B Lithium-ion	6-cell	6-cell	6-cell
Expansion	5-in-1 card reader (x-D/SD/MMC/MS/MS Pro); Type II PC Card slot	Express Card 53 (34) slot	ExpressCard/34 Slot; PCMCIA Type I/II (Cardbus Support); Memory Stick Duo Slot; port replicator connector	ExpressCard; 5-in-1 card reader (SD/MMC/MS/MS-Pro/xD)	5-in-1 card reader (MS/MS-Pro/SD/MMC/xD)	SD; Memory Stick/ Memory Stick PRO; xD; PC Card Type II
Other I/O ports	S/PDIF support; Fast Infrared (FIR); S-Video; External display (VGA); ezDock II connector; line-in port; line-out port	Mini 1394; COM; TV output (HDTV out); headphone; microphone; S/PDIF output; RJ-45 for 10/100/1000 LAN; RJ11; DC-in jack	4-pin i.Link (IEEE 1394) S400; S-Video; RJ45 Ethernet; RJ11 modem; headphone; microphone; monitor connector (VGA, D-SUB 15 pin)	FireWire (IEEE 1394); RJ-45 Ethernet; S-Video; VGA/D-Sub; DC-IN; microphone-in; SPDIF connection (shared with headphone-out jack)	Firewire (IEEE 1394); RJ-45 Ethernet; RJ-11 modem; S-Video; DVI-D output; SPDIF connection; VGA/D-Sub; PCI Express; DC-in for power supply; microphone-in; Line-in	Firewire; S-Video; Port Replicator; headphone; microphone; mini S-Video out; RJ11 (modem); RJ45 (LAN)
USB	4	3	3	4	4	3
Weight	3.81kg	2.6kg	2.8kg	2.1kg	2.8kg	Approx. 1.7kg (more with optical drive)
Dimensions (WDH)	400 x 271 x 35.5mm	360 x 267 x 25.4mm	366 x 274.5 x 26-35.3mm	334 x 227.5 x 27.9 (front) ~30.0 (rear) mm	338 x 248.8 x 23.0-36.1mm	295 x 238.5 x 34mm
Other (eg. fingerprint scanner)	Integrated 1.3-megapixel Orbicam	USB 2.0 Hybrid TV Tuner	Webcam	Integrated 1.3-megapixel webcam	NA	Fingerprint reader
Operating system	Vista Home Premium	Vista Home Premium	Vista Home Premium	Vista Business	Vista Business	Vista Business
Price	\$2,499	\$1,899	\$2,299	\$1,999	\$2,299	\$2,499
Warranty	1yr pickup/return; 1yr International Travellers Warranty	1yr return	1yr	2yr	2yr	2yr pickup/return
Online	www.acer.com.au	www.protac.com.au	www.sony.com.au	www.benq.com.au	www.benq.com.au	www.lifebook.com.au



✓	Strong performance and battery life.	Relatively cheap.	Strong performance.	Strong battery life.	Strong performance.	Strong battery life; light.
✗	Big and heavy.	Poor performance and battery life.	Poor battery life.	Poor performance.	Poor battery life.	Poor performance.
Verdict	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆

HP COMPAQ NX9420	DELL INSPIRON 640M	TOSHIBA SATELLITE P200	TOSHIBA SATELLITE A200	LENOVO 3000 N100	THINKPAD T60	PIONEER M57U
Intel Core 2 Duo T7200 2GHz	Intel Core 2 Duo T5600 1.83GHz	Intel Core 2 Duo T7200 2GHz	Intel Core 2 Duo T7200 2GHz	Intel Core 2 Duo T5600 1.83GHz	Intel Core 2 Duo T7200 2GHz	Intel Core 2 Duo T7200 2GHz
1GB DDR2	2GB DDR2	2GB DDR2	2GB DDR2	1GB DDR2	1GB DDR2	1GB DDR2
Intel 945PM	Intel 945GM	Intel 945PM	Intel 945PM	Intel 945GM	Intel 945GM	Intel 945PM
120GB	160GB	200GB	160GB	120GB	100GB	120GB
DVD +/-RW Super-Multi Dual-Layer Fixed	8x DVD +/-RW Combination drive Dual- Layer	DVD-Super-Multi +/-R Dual-Layer	DVD Super-Multi Double Dual-Layer	DVD Recordable Dual- Layer; 24x Max	DVD Recordable Dual- Layer; EIDE; 24x Max	DVD-/+RW Dual-Layer
17in	14.1in	17in	15.4in	15.4in	15.4in	17in
1,680 x 1,050	1,440 x 900	1,440 x 900	1,280 x 800	1,280 x 800	1,280 x 800	1,920 x 1,200
ATI Mobility Radeon X1600	Intel Media Accelerator GMA 950	Nvidia GeForce G 7600 with 256MB video memory (128MB discrete video memory and up to 128MB shared system memory using TurboCache)	Nvidia GeForce G 7300 with 256MB video memory (128MB discrete video memory and 128MB shared system memory using TurboCache)	Nvidia GeForce Go 7300 with Turbo Cache 128MB	ATI Mobility Radeon x1400	Nvidia GeForce Go 7900GTX 256MB
802.11 a/b/g; Bluetooth 8-cell	802.11a/b/g; Bluetooth 6-cell	802.11 a/g/n; Bluetooth 6-cell	802.11 a/g/n; Bluetooth 6-cell	802.11 a/b/g; Bluetooth 6-cell	802.11 a/b/g; Bluetooth 6-cell	802.11 a/b/g 8-cell
Type I/II PCMCIA card slot supports both 32-bit CardBus and 16-bit cards; 7-in-1 media reader	Express Card Connectors: ExpressCard slot 54mm 1.5V and 3.3V; does not support the older PCMCIA interface; 5-in-1 removable memory card reader	Express Card; 6-in-1 card reader Adapter (SD/SD- IO/MS/MS PRO/Multi Media Card/xD Picture Card [shared slots])	PC Card slot supports Type II PC Card; Express Card; 5-in-1 card reader Adapter (SD/MS/MS PRO/Multi Media Card/xD Picture Card [shared slots])	PCMCIA Type I/II; 4-1 digital media reader (SD/ MMC/MS/XD)	PCMCIA slot	7-in-1 card reader (MS/ MS DUO/SD/Mini-SD/ MMC/RSMCC)
VGA; audio in/out; power; RJ-11; RJ-45; S-Video; TV out; IEEE 1394a; docking; HP Travel Battery	IEEE 1394 Integrated (1394 cable and software sold separately); RJ45 Ethernet; RJ11 modem; Video: 15-pin monitor connector; S-Video: 7-pin mini-DIN connector; Audio jacks: Stereo headphones/speakers miniconnector (same as line-out); microphone miniconnector	TV out; Bridge media slot; 6 buttons (CD play); S- Video; headphones; microphone; RJ45 (LAN); RJ11 (modem); FireWire	RJ11 (LAN); S-Video; VGA; RJ45 (modem); headphone; microphone	External Display (VGA); External microphone/ line-in; headphone/line out; IEEE 1394; RJ-11; RJ-45; S-Video out	Headphone; microphone; RJ45 (LAN); RJ11 (Modem); VGA-out	Mini IEEE1394a; Serial; DVI port; S-Video jack for TV output; TV input jack (Optional function with TV Tuner); headphone jack; microphone jack; S/PDIF output; RJ-45 for LAN; RJ- 11 for modem; line-in jack; DC-in jack
4	4	4	4	4	3	4
3.35kg	2.41kg	3.3kg	2.7kg	2.8g	2.6kg	3.8kg
393 x 275 x 33mm	330 x 244 x 31.75 - 38mm	394 x 275 x 35.9- 41.9mm	360 x 267 x 29.8- 36.8mm	360.1 x 266.7 x 38.6mm	357.5 x 255 x 28.7mm	397 x 294 x 22-44mm
Fingerprint reader	NA	Fingerprint reader; 1.3- megapixel webcam/mic	Fingerprint reader; 1.3- megapixel webcam/mic	Fingerprint reader; integrated webcam	Fingerprint reader	NA
Vista Business	Vista Home Premium	Vista Home Premium	Vista Home Premium	Vista Business	Vista Business	Vista Home Premium
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Excellent performance and battery life.	Excellent battery life.	Strong performance; 802.11n; 200GB drive.	Battery; performance; 802.11n; good value.	Good keyboard.	Good all-round performance; compact.	Ridiculous 3D performance.
Big and heavy.	Average performance.	Poor battery life; heavy.	Enough with the funky keyboards.	No standout test results.	Less features than the A200.	Poor battery life; heavy and expensive relatively.
★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆



CHRISTOPHER ZAMMIT – ART DIRECTOR

APC's resident Art Director and professional photographer, Chris spends a lot of time working with DSLRs, making him the right man for the (reviewing) job.



Sub-\$2,500 digital SLRs

Going shopping for a new camera anytime soon? *Christopher Zammit* focuses on what factors you should consider to find the best DSLRs under \$2,500.

Buying a DSLR camera is a lot like buying a car. Essentially, they all do the same thing and are not a cheap purchase. Regardless of its make and model, the car's primary purpose is to get you from A-to-B; the only difference between brands is how fast it does it and how many extra features it has. The basic functionality is the same. The DSLR cameras reviewed here can be described in a similar way; they all take great pictures using similar technology under the hood. On researching the market, we found

that the maximum reasonable price for non-professional DSLR cameras was around \$2,500. With the features and functionality we will be looking at here, we see no reason why a non-professional would want or need to spend any more than this. Another good reason not to exceed this limit is that the sub-\$2,500 DSLR category encompasses many of the more popular and well-known models from Nikon, Canon and Olympus.

Above this range, the prices tend to jump dramatically as you move

into the professional DSLR market. In the sub-\$2500 price range DSLRs share many basic features. For example, all the cameras we are looking at have auto and manual focus, shutter speeds from 30 seconds to 1/4,000th of a second (except the Olympus models, which has up to a whopping 60 seconds) and comparable ISO ranges and white balance functions as a basis.

Just so it's clear, any of these cameras will take good high-quality images for the average user. The

models selected represent the best cameras available from a range of manufacturers at a range of prices.

In the following pages we'll describe each one in order of price (from the lowest to highest), so you can see what improvements in performance and extra features you can get with each step up in price. We purposely went out of our way to make sure we didn't review any duds, so rest assured that any DSLR you choose from this roundup has our approval. The choice depends on your tastes and budget.

EXPLAINED

A QUICK RUN-DOWN OF THE KEY DSLR FUNCTIONS

To help you get the most out of the roundup, here are the key terms and features of digital photography explained.



RAW files may need dedicated conversion software to help preserve data.



WHITE BALANCE: In life, all kinds of light sources emit varying colours of light due to colour temperature. The higher the colour temperature, the cooler (or more blue) the light becomes. The lower the colour temperature, the warmer (or more red) a light will look. For example, incandescent lights in your home give off a warm glow that can confuse your DSLR. Fluorescent lighting on the other hand will cast cooler tones in an image if photographed uncorrected. We can't see this, but the DSLR records these colours. In digital photography, if this is not corrected, indoor pictures will inevitably come out with a yellow or bluish cast.

White balance helps compensate for this by searching out a spot of pure white in an image as a reference point. This spot (either found automatically or manually depending on which white balance mode you are using) is then used to calculate the colours in the image based on what colour cast it has. If the spot (which is supposed to be white) looks yellow, the camera will compensate for the shift, giving accurate colours.

RAW AND JPEG FILES: A RAW file is essentially the data that the camera's chip recorded, along with some additional information tagged on. A JPEG file is one that has had the camera apply linear conversion, matrix conversion, white balance, contrast and saturation, and then has had some level of potentially destructive compression applied.

Attached to the RAW file is a header file that contains the camera's information in regard to colour saturation, white balance and so on. RAW files are saved in 12- or 14-bit modes, which allows for greater image quality, whereas JPEGs are compressed and saved in 8-bit mode, which loses data and quality.

RAW allows the user to fine-tune and adjust the exposure and white balance etc. of images without altering the original image data. The more commonly used JPEG files have this image compressed and embedded at the time of shooting. Once you alter any aspect of a JPEG, data is either lost or altered. RAW allows editing of an image without losing quality or the original image data, which can be retrieved.

ISO: The role ISO plays in film use refers to the 'speed' of the film — it stills works the same way in digital photography. ISO indicates your digital camera's sensitivity to light. The higher the number, the less light is needed to take a photo that is correctly exposed. In bright light, you'll normally use ISO 100. As light decreases, you will need to increase the amount of light getting in to your camera. Rather than decrease the shutter speed, you can increase the ISO. This will increase the sensitivity of the camera, which means you can get the same shot with less light entering the camera. Thus, the shutter speed can be kept low enough to avoid blurry images. As increasing the ISO will allow you to increase the shutter speed, a high ISO will also help when taking fast-moving sports shots. There is one catch however: higher ISOs usually result in slight image degradation. This is referred to as noise.

Pentax K100D

CONTACT	Pentax
ONLINE	www.pentax.com.au
MARKET	Everyone
PRICE	\$999

✓ Compact; value; digital preview.

★ ★ ★ ★ ★

✗ Knobs uncomfortable.

Starting at the bottom doesn't necessarily mean starting with the worst. Pentax delivers a great DSLR in the K100D, which can do most things that the more expensive models can, as well as some things a few of them can't.

Inside the K100D is a CCD-shift image stabilisation system which Pentax calls Shake Reduction

(for obvious reasons). This system allows sharper handheld photos to be taken at slower shutter speeds, where a tripod would previously have been necessary. This feature is handy if you're in a situation where flash would be useless. The fact that the system is built into the body means it is compatible with all Pentax lenses.

On the outside it's not a bad little beast — it looks like it means business. The body has been well-designed with a great feel and accessible controls. It has a good weight that (like the D80) feels great to hold.

Simultaneously a drawback and a

benefit of the body design are the knobby protrusions on the rear of the camera which are there to lend grip and stability (which they do), while digging uncomfortably into the middle of the thumb.

Although the K100D only has 6.1 megapixels, the image quality is still impressive. Other features include full manual controls and an 11-point through-the-lens (TTL) autofocus system. It defaults to auto mode, but you can also manually select a focus point or set it to centre spot. As in the more expensive models, the system also allows you to choose from single or continuous AF.

One of the more innovative new features is the digital previewing system. When you slide the power switch to the aperture blade icon, you get either a digital or optical preview of the depth of field (DOF). Nice! No more shots with the main subject out of focus which you then have

go back and reshoot. The K100D snaps a picture and displays it on the LCD, but without saving it to the SD card.

Another handy feature is that the K100D gives you the choice of either using two rechargeable CR-V3 batteries or substituting these with four AAs in the case of an emergency.

For file sharing the camera uses Secure Digital (SD) and MultiMediaCards, and if you're using firmware version 1.01 or later you can use the new SD High Capacity (SDHC) cards as well.

The advantage of getting a Pentax is that they are now compatible with newly branded Samsung lenses. So with double the choice of lenses and the ridiculously good price of around \$990 (with a lens, no less) the K100D would be a great starting point for students, families or anyone who wants to take that first step into the world of DSLR.





Nikon D40X

When you hear the word Nikon you immediately think of big, expensive DSLRs. The D40 breaks those rules by being a solid, well-made camera at a reduced size. As the smaller (and newest) of the Nikons it has a similar feel and price to the Canon 400D, which it was introduced onto the market to compete with.

Smaller does not always mean better. Although the body is light (only 495g), the D40X is a little awkward to hold and would benefit from a wider hand grip. The controls are easily accessible and have been logically placed around the body making for easy use.

Compared to the other compact DSLRs, the D40X has a noticeably superior focusing screen within the viewfinder. The size and clarity allows for a more accurate view of your subject, whereas the LCD information is bold and easily readable.

This well-built upgrade to the D40 retails for just under \$1,300 for

the 18-55mm ED kit. It better the K100D with the inclusion of a 10.2 megapixel DX CCD sensor (the K100D is 6.2MP), ISO of 100 to 1,600 (extendable to 3,200), burst mode of three frames per second and a 2.5in LCD screen (230,000 pixels).

The D40X's 10.2MP CCD imaging sensor is complemented by Nikon's 3D Color Matrix Metering II and an improved Nikon Image Processing Engine that together ensure improved image quality with analysed exposure, refined details and natural, accurately rendered colors. As you can see with newer technologies, the D40X gives you some greatly improved features over the K100D for your dollar.

A standout feature for us is the improved Auto ISO function, which is pulled straight from the more expensive Nikon D80 (see page 69). The Auto ISO lets the camera do the

CONTACT Nikon
ONLINE www.nikon.com.au
MARKET Everyone
PRICE \$1,299

✓ 10.2MP; great larger images.

VERDICT ★★★★★

✗ Awkward grip.



hard work of metering, while staying within your set limits of maximum ISO or minimum shutter speed, depending on your preferences.

With the D40X, Nikon has strived to eliminate common annoyances such as its infamous shutter lag and inaccurate viewfinder issues, while answering

consumers' needs for high image quality and simplicity. Personally, I don't believe a DSLR can be described as simple for most people, but the D40X comes pretty close.

Canon EOS 400D

The 400D offers a lot of technology in a lightweight body. A respectable 10.1 megapixels means it holds its own with the more expensive models. With images read through the

Canon CMOS sensor, the 400D provides

good, clear photos that will keep most users more than happy.

Being both the third smallest and lightest in this roundup, this stylish looking DSLR has an almost toy-like feel compared to the larger models. This works to its

advantage though, as its size means that many of its controls are within easy reach of your thumb. A

drawback is that the grip is a little thin and feels precarious to hold. Expect to get hand cramps if you're using this for any length of time.

There are functions galore onboard with 9-point autofocus, which is handy in a multitude of

CONTACT Canon
ONLINE www.canon.com.au
MARKET Everyone
PRICE \$1,349

✓ Easy to use; good value.

VERDICT ★★★★★

✗ Grip not suited for long use.

situations. If that sounds a bit scary you can always switch to full autofocus and let the camera do it for you. A frame-rate of 3fps (the same as the D40X) paired with a shutter speed of 1/4000th of a second matches everything else on offer from the other models bar one.

For the beginner, the mode dial makes for easy use. A selection of twelve major shooting modes allows for great versatility. With just a turn of the dial you can transfer from full auto to inbuilt macro and an assortment of light settings. Full manual capability is available (including manual focus) for the more advanced.

With a bright clear 2.5in screen, the 400D displays sharp clear images with good colour. Menus are easy to navigate, although they are a bit fiddlier than others due to the need to continually scroll up and down to access new sub menus.

A nice function is the Integrated Cleaning System which automatically removes unwanted dust using and ultrasonic vibrating unit that literally shakes the dust off the image sensor.

A great range of Canon EF series lenses are available from macro to 600mm zoom. Accessories such as speedlites and filters also increase the appeal of the 400D.

From a shooting point of view, the focusing screen appears small and far away compared to other models, giving the user the feeling that they are shooting through a tunnel. On the plus side, it has a bold LCD that is easily readable.

If you have the cash, then we recommend you go for something more substantial, but if you're on a budget then the 400D is a good mid-price DSLR. But it's only marginally better than the D40X. (Reviewed in full above.)



Samsung GX-10

This is technically the second Pentax camera in our roundup. Samsung has re-badged the Pentax K10D and re-released it as the Samsung GX-10 with re-badged Pentax lenses as well.

The GX-10 has a dust-and-weather-sealed body, with a build quality that's rare for its price class. It has a wide, well-formed grip and is easy to hold as you use the two control wheels on the front and rear. It seems to nuzzle into the palm of your hand as you shoot.

With a nice set of features, the GX-10 includes some options beyond its price range: Integrated lens-shift Shake Reduction technology to artificially steady the hand; a full set of exposure modes, including Bulb and external sync; interchangeable focusing screens; and an 11-point selectable autofocus.

We liked the preview option that flips up the mirror to display a snapshot of the scene you are

about to take. With an optical depth-of-field preview, this surpasses what the K10D has to offer in this area.

Colour temperature presets for white balance make life easier and allow more image control for the experienced, while a fairly reliable auto white balance is available for beginners.

With a shutter lag of about half a second in good light, the GX-10 comes in around the average; just be patient though, as this time increases in poor light.

A must nowadays is the option to shoot simultaneous JPEG and RAW, which it handles well, with fast (but average) speeds of 3.1fps.

Unlike similarly priced entry-level models, the GX-10 lacks the step-up automation, such as scene modes and verbose help, that assists newbies making the snapshot-to-SLR transition.

A 10-megapixel CCD produces beautifully sharp images that we

CONTACT Samsung
ONLINE www.samsung.com.au
MARKET Everyone
PRICE \$1,499

✓ Excellent images; preview option.

VERDICT ★★★★★

✗ Images slightly darker.

were impressed with. With its broad (but once again standard) ISO range from 100 to 1,600, the CCD allows for good colour reproduction. A minor (but debatable) drawback is that the GX-10's images seem a little darker than others. Not a problem for us though, as we believe having images turn out a little dark is better than having them a little light. Besides, this can always be quickly corrected by the ultra-fussy of us on the PC before printing.

The GX-10 really lets you see where your money's

going. Packed with features and a more professional feel, Samsung (or Pentax depending on how you look at it) has delivered a great DSLR for everyone from the noobs to the keen amateur.



Olympus E-410

As reported in our May issue, Olympus has claimed to have launched the world's smallest DSLR. With the dimensions of just 129.5 x 91 x 53mm (WHD) deep, it comes in slightly smaller than the Canon 400D. As becomes evident when first holding it, the size and weight of the E-410 gives it a feel more akin to using a digital compact than a DSLR. Don't let its size

fool you though — inside this compacted body lies impressive functionality.

In a bid to move the compact market towards purchasing DSLRs, the E-410 shares some features with its compact cousins. The ability to

view and shoot images through the LCD screen is a major one that should appeal to those new to the market. The dual-mode control display with a huge 176-

degree viewing angle

challenges the LCDs of regular DSLRs.

Featuring a 10-megapixel image-sensor and a new processing chip, the

CONTACT Olympus
ONLINE www.olympus.com.au
MARKET Everyone
PRICE \$1,499

✓ Live view system; easy to use.

VERDICT ★★★★★

✗ In-camera cropping would be nice.

Olympus E-410 delivers bright colours with low noise and good details, even at higher ISO settings, with improved continuous shooting at 3fps for JPEG HQ or 7 RAW. The images made by the Olympus E-410 are of excellent quality. The quality is fine for a kit lens, however, if you invest in a higher quality lens, you will be able to capture more detail. The images are on the soft side as far as sharpness is concerned, but a small sharpening through an image-editing program like Photoshop will do the trick. In-camera cropping, which is something we could all use, is another handy function.

Olympus has also introduced a dust-reducing inbuilt Supersonic Wave Filter which seems to do the job well. A great range of white balance modes are present, including the necessary auto, manual, overcast, shade, tungsten, fluorescents, sunlight and white balance adjustment. ISO sensitivity choices are auto (100-4,000) and

manual (100-1,600), which place it in the good but average category. The Olympus E-410 has a built-in flash offering auto, red-eye reduction, slow sync and other settings. The flash power is good, but, as with all included flashes, they are effectively useless over a distance greater than seven feet.

Olympus has dumbed down the DSLR with the 20 pre-selected scene modes. The aim to attract compact users is evident here.

Still images are recorded as EXIF 2.2, PIMIII, DPOF, DCF and can be viewed on the 2.5in HyperCrystal LCD with playback choices including histogram, zoom, index, slide show and calendar.

With all these new gadgets and fine image quality to boot. The age of the compact DSLR may well be here. With the basic functions as good, but no better than some cheaper models, you need to decide if you really want to pay for the privilege of the extra functionality.





Sony A100

Sony has created a solid piece of equipment with the A100. The body is strong and robust with the traditional SLR look. A fantastically moulded grip and

a lightweight frame make it comfortable to hold, placing functions and menus within easy reach of the thumb. The design is spoiled though by the shutter release, which has been placed too far back for comfortable shooting. We continually found our fingers going to the front scroll wheel everytime we tried to take a shot.

The standard-sized 2.5in LCD fits nicely on the back of the unit and is protected by an anti-reflection screen which is designed to reduce glare (it helps).

An impressive addition which helps with battery life is the EyeStart Auto Focus System which activates when you look

CONTACT Sony
ONLINE www.sony.com.au
MARKET Everyone
PRICE \$1,649

✓ Eyestart autofocus; battery life.
VERDICT ★★★★★
✗ Shutter speed release.



through the viewfinder. Also with image stabilisation, the A100 utilises Sony's SuperSteadyShot inside that moves in the body of the camera to compensate for hand shake. The idea of placing this system in the body was a good one as this means all Sony-compatible lenses can benefit from this feature.

As with the Canon 400D, dust reduction technology has also been utilised here. The A100 system uses a static-free coating on an optical-low-pass filter coupled with a vibration mechanism that literally shakes dust off the CCD.

The 10.2-megapixel CCD performs well in low light without flash to capture great images. The Advanced mode adjusts lighting and shadow without affecting areas that don't need improvement. To recover details in dark or bright areas of the picture,

the A100 provides two levels of Dynamic Range Optimisation: Normal DRO, to improve shadow detail using standard gamma curves for fast shot-to-shot response time, or Advanced DRO, to adjust dynamic range area-by-area for the greatest precision.

High-speed continuous shooting with high-speed image processing and writing make for fast shutter speeds and good response times.

The A100 also boasts long-lasting battery stamina and the options of using Flash I and II memory cards — as well as supplying an adaptor for Memorystick Duo cards.

Sony isn't the first name that springs to mind when you mention DSLR cameras. With the A100, Sony has created a camera that holds its own against the more established players in the field. It's just a shame about that shutter release button.

Olympus E-330

Well, this looks different. As we have seen, all the DSLRs in this round-up share many things in common. Most obviously, the shape of their bodies. The E-330 breaks from the traditional look and goes its own way with a highly designed body that reminds us of the old Leicas. The main differences are the non-centralised

viewfinder (which took some getting used to) and the adjustable LCD. The pop-up flash that is placed off-centre to the lens is intended to help with avoiding red-eye.

The design theme is continued with the rubber grip, making the E-330 more stable to hold while the thumb and forefinger access the perfectly placed dials and controls.

As with the E410, the E-330 has included a live view system with two preview options. You

can choose between an LCD preview or a mirror lockup mode in which the LCD shows exactly what's on the NMOS capture sensor.

CONTACT Olympus
ONLINE www.olympus.com.au
MARKET Everyone
PRICE \$1,799

✓ Live view; image quality; features.
VERDICT ★★★★★
✗ Slow on startup; single shot slow.

Whereas the E-410 is primarily a first-time user's DSLR, the E-330 is packed with both sophisticated and novice-level features.

For beginners, there are the obligatory multiple scene moods covering all conditions you could encounter (and some you may never use, like underwater).

The more advanced manual controls are still present for intermediate users, with adjustable ISO and shutter speeds etc. As mentioned in our intro, these shutter speeds and ISO settings are comparable across the field.

Exposure compensation is another handy function that is adjustable to plus-or-minus five stops. There is also a centre-weighted and evaluative metering scheme that gives more control over how your image is lit, as well as three-point auto focus to ensure that the areas you want to be sharp actually are. With over seven white balance settings including auto, there is a wealth of photographic

control at your disposal.

Simultaneous RAW and JPEG capture is a welcome and rare edition. The ability to fine-tune and save contrast, sharpness, saturation, and white-balance settings should, as well as five types of bracketing, keep the pros busy.

At this price range, depth-of-field preview seems to become a standard feature. Anti-shock mode, which decreases camera shake, is a new feature to our round-up too. A little slower than others to start up, the E-330 demonstrates only average performance. Its shutter lag of about 0.5 seconds in good light and 0.7 seconds in dim light isn't bad. The speed is acceptable though, as the E-330 can take continuous shots up to the standard three fps. In single shot mode, however, it can only manage one shot every 0.8 seconds.

A good camera with all the gadgets that gets let down sometimes by its own cleverness. The E-410 may be a better bet.



Nikon D80

This isn't anywhere near being the largest camera in this roundup, but when you pick this baby up you can't help but feel that you're holding a serious DSLR. Strong and solid



with a professional feel, the D80 is a pleasure to hold.

A contoured hand grip allows for maximum comfort and frees up the fingers for easier access to the controls. You can even swing it off the tips of your fingers and still feel secure.

Most of the buttons are the same — and in the same places — as the D70 which it is replacing. Everything is well located on the body.

A group of buttons controlling commonly used features are located next to the shutter, allowing easy changes to be made in metering, exposure, drive modes and autofocus.

The less-used functions, such as white balance, ISO and image size and quality settings have been shuffled down the back near the LCD where they each have their own buttons to avoid scrolling

CONTACT	Nikon
ONLINE	www.nikon.com.au
MARKET	Everyone
PRICE	\$1,995

✓ Best body; fast; image quality.

VERDICT ★★★★★

✗ Nothing to speak of.

through menus. While aperture and shutter speeds are easily accessible through dials on the front and back of the grip, everything is within easy reach and placed in order of priority.

The D80 menu system is straightforward and intuitive. A 'My Menu' function even allows users to choose which menu items the LCD displays. A new addition is the retouch menu that allows photo editing in camera. You can adjust size, cropping, red eye and filter effects before touching a PC. RAW images can even be combined and overlaid with varying opacities. Nice!

Professional controls borrowed from the more expensive Nikon D200 include selectable white balance and an advanced autofocus system.

The D80 includes Commander Mode, which allows control over compatible Nikon Speedlights without the need for separate wireless triggers. Why control

one speedlight when the D80 will let you slave up to four?

With 0.1 seconds to start up and a shot taken every 0.3 seconds, this beast burns through the images. At 3.33fps, this is the fastest you'll get under \$2,000.

To top it off, the D80 takes fantastic images with little noise. Accurate colours and exposure gave superb results in most lighting conditions, with only slight bias towards shadows over highlights in darker scenes.

With my past career as a cruise ship photographer, I still keep in touch with friends who are doing the job today. It wasn't surprising to find that many of them used the D80 for professional work, where it flourished under long, harsh work conditions.

The D80 is a great piece of equipment and, after playing with it, I want one. For its price, it has the look, feel and performance of a professional DSLR.

Canon EOS 30D

Coming in as the most expensive camera in our test, the 30D is the larger cousin of the 400D. With a good-sized, solid body and a rubberised grip for stability, the 30D has a professional feel with easy-to-locate controls.

As it is not the largest DSLR, there isn't a lot of room for multiple LCDs and dedicated buttons. To make alterations to settings such as ISO, resolution and image size you need to go into the main LCD menu. This is a real pain when you are constantly in need of altering these settings.

The frame rate is blindingly fast at 5fps, which blitzes anything else we've looked at here. That's under ideal conditions though, with an average of 3.5fps to be expected as the norm.

Spot metering is available but not as tight as other models, which allows for less accuracy. The ability to set ISO sensitivity in 1/3-stop increments allows for very fine control over your depth of field.

The standard-sized 2.5in LCD has a wide viewing angle which comes in handy, while settings such as contrast, saturation, tone and sharpness are easily sorted with Canon's Picture Styles.

With a fast startup time and impressive autofocus performance which uses a nine-point system, the 30D is great for capturing shots in a hurry. The ability to capture simultaneous RAW and JPEG images is another benefit.

Even though it only has 8.2 megapixels compared to other cheaper models, the 30D captures clean images that are fairly clear of noise. With the best ISO range of the roundup, the 30D performs well at most ISOs all the way up to its maximum 3,200-equivalent high setting. This is part of what makes it so good in low light and makes producing large clear prints possible.

The auto white balance does the job well and produces colours

CONTACT	Canon
ONLINE	www.canon.com.au
MARKET	Everyone
PRICE	\$2,450

✓ Low light operation; fast autofocus.

VERDICT ★★★★★

✗ Expensive; fiddly; no anti-shake.

that are accurate with good saturation. (Although, the metering system can tend to be biased to highlight areas.)

Sharpness with the 30D was an issue in some conditions, so we recommend you set it to its maximum to get the most out of it. This was nothing to do with the lenses, which are all of the high quality that you would expect from Canon, but more the CCD itself.

For the price, some notable features seemed to be missing, such as an anti-static system and anti-shake, which are both present in some of the lower price models. As mentioned, the menus

and awkward usability take the shine off what would be a great piece of equipment. Its simplicity and lack of extras may appeal to some, but we can't help but think that they could have included more for the money.





SO... WHICH ONE?

As we stated at the start, any one of these cameras can take great pictures and do the job well. It wouldn't be fair for us to just pick an outright winner over the vast price range we are looking at (\$995–\$2,450).

So, what we'll do is make recommendations on three price categories.

For the overall best DSLR for under \$2,500, we'd have to say that the Nikon D80 is hard to beat. It just oozes quality. With great images, fantastic controls and useful functions, this camera will suit anyone from the beginner to the low-end professional.

If a cheap DSLR is what you're after, then the Pentax K100D is a good way to go. Its good image quality, solid body and great features such as anti-shake make it a bargain at under \$1,000.

For the mid-range there are two alternatives. For compact size and ease of use, the Olympus E410 excels. It's perfect for the beginner with its compact and simplified controls.

The Canon 400D is even better in many ways, as it allows for ease of use for the beginner, paired with the ability to develop more advanced skills as you learn.

This shows what quality can be obtained from a relatively modest price. Unless you plan on working as a professional photographer, there is no need to spend more than \$2,500. As we've seen, with the Nikon D80, you can even work professionally and get great results with a sub-\$2,000 camera.

	NIKON D40X	NIKON D80	CANON EOS 30D	CANON EOS 400D
Contact	Nikon	Nikon	Canon	Canon
Online	www.nikon.com.au	www.nikon.com.au	www.canon.com.au	www.canon.com.au
Price	\$1,299	\$1,995	\$2,450 (enthusiast kit)	\$1,349
Effective pixels	10.2 million	10.2 million	8.2 million	10.1 million
Image sensor	RGB CCD, 23.6 x 15.8mm	RGB CCD, 23.6 x 15.8mm	CMOS sensor	CMOS sensor
Largest image size	3,872 x 2,592 pixels	3,872 x 2,592 pixels	3,504 x 2,336 pixels	3,888 x 2,592 pixels
Sensitivity (ISO)	100-1,600	100-1,600 plus HI-3, HI-7 and HI-1	100-3,200	200-1,600
File format	Compressed NEF (RAW), 12-bit compression, JPEG	Compressed NEF (RAW), 12-bit compression, JPEG	JPEG or RAW – simultaneous recording	JPEG or RAW – simultaneous recording
Storage media	SD memory card, SDHC compliant	SD memory card, SDHC compliant	Compact Flash (CF) card (Type I and II)	Compact Flash (CF) card (Type I and II)
White balance	Auto (TTL with 420-pixel RGB sensor); six manual modes; preset white balance	Auto (TTL with 420-pixel RGB sensor); six manual modes; preset white balance; colour temperature setting	Auto; daylight; shade; cloudy; Tungsten; fluorescent; flash; custom; colour temperature	Auto; daylight; shade; cloudy; Tungsten; fluorescent; flash; custom
LCD monitor	2.5in	2.5in	2.5in	2.5in
Interface	USB 2.0 (High-speed) mass storage and MTP/ PTP selectable	USB 2.0 (High-speed) (mini-B connector); SD card slot; supports firmware updates via SD cards	Digital terminal USB 2.0 (High-speed); video output NTSC/PAL; PC terminal; remote control terminal	Digital terminal USB 2.0 (High-speed); video output NTSC/PAL; remote control terminal
Focusing modes	Autofocus (AF); instant single servo AF; continuous servo AF; auto AF-S/AF-C; manual focus	Single area AF; Dynamic area AF; Auto-Area AF; manual focus	Autofocus (One shot AF, Predictive AI servo AF); manual focus	Autofocus (One shot AF, Predictive AI servo AF); manual focus
Minimum shutter	1/4,000th sec	1/4,000th sec	1/8,000th sec	1/4,000th sec
Maximum shutter	30 seconds	30 seconds	30 seconds	30 seconds
Dimensions	126 x 64 x 94mm	132 x 103 x 77mm	144 x 105.5 x 73.5mm	126.5 x 94.2 x 65mm
Battery	Rechargeable Lithium-ion EN-EL9	Rechargeable Lithium-ion EN-EL3e; optional pack	Rechargeable Lithium-ion BP-511; AC adaptor	Rechargeable Lithium-ion NB-2LH; AC adaptor
Weight	495g	585g	700g	510g



 	10.2MP: great images at larger sizes; auto ISO.	Best body; very fast; excellent image quality.	Low light operation; fast autofocus; image quality.	Easy to use; good value.
	Awkward grip.	Nothing to speak of.	Expensive; fiddly; no anti- static/anti-shake.	Grip not suitable for long use; focus screen.
Verdict	★★★★☆	★★★★★	★★★★☆	★★★★★

SONY A100	SAMSUNG GX10	PENTAX K100D	OLYMPUS E-330	OLYMPUS E-410	
Sony	Samsung	Pentax	Olympus	Olympus	Contact
www.sony.com.au	www.samsung.com.au	www.pentax.com.au	www.olympus.com.au	www.olympus.com.au	Online
\$1,649	\$1,499	\$999	\$1,799	\$1,499	Price
10.8 million	10.2 million	6.1 million	7.94 million	10.9 million	Effective pixels
23.6 x 15.8 (APS-C size) interlace scan CCD	23.5 x 15.7 mm CCD with 10.75 million photosites	23.5 x 15.7mm interline interlace CCD with 6.31 million photosites	Live MOS sensor (4/3 type MOS solid-state image sensor)	Live MOS sensor (4/3 type MOS solid-state image sensor)	Image sensor
3,872 x 2,592 pixels	3,872 x 2,592 pixels	3,008 x 2,008 pixels	3,136 x 2,352 pixels	3,648 x 2,736 pixels	Largest image size
100-1,600	100-1,600	200-3,200	100-400; expandable to 1,600	100-1,600	Sensitivity (ISO)
JPEG; RAW; RAW+JPEG	RAW; JPEG; EXIF 2.21; DPOF 1.1; PictBridge 1.0	RAW (PEF, DNG); JPEG (EXIF 2.21); DPOF	JPEG; TIFF (RGB 8-bit); RAW (12-bit)	RAW; JPEG; RAW+JPEG	File format
Memory Stick Duo; Memory Stick Pro Duo; Compact Flash (Type I and II); Microdrive	SD or SDHC card	Secure Digital; Secure Digital High Capacity	CompactFlash (Type I and II); Microdrive; xD picture card (dual-slot)	CompactFlash (Type I and II); Microdrive; xD picture card (Dual slot); xD-Picture Card slot	Storage media
Auto; Preset (daylight, shade, cloudy, Tungsten, Fluorescent, Flash); colour temperature	Auto; daylight; shade; cloudy; Tungsten; fluorescent (W, D, N); flash; manual; Kelvin settings plus fine-tuning	Auto; presets; custom; daylight; shade; cloudy; Tungsten; fluorescent; flash; manual	Lamp 1; fluorescent 1; fluorescent 2; fluorescent 3; daylight; cloudy; shade	Lamp; fluorescent 1; fluorescent 2; fluorescent 3; daylight; cloudy; shade	White balance
2.5in	2.5in	2.5in	2.5in	2.5in	LCD monitor
USB 2.0 Hi-speed (mass storage mode/PTP)	USB 2.0 Hi-Speed	PictBridge; USB	USB 2.0 (Full speed)	USB 2.0 High Speed	Interface
Autofocus (AF automatic, one-shot AF, continuous AF); manual focus	Single; continuous AF; manual focus	TTL Phase-matching 11-point wide (SAFOX VIII) AF; single/continuous AF; Focus point selection	Single AF; continuous AF; manual focus; single AF + MF; continuous AF + MF	Single AF (S-AF); continuous AF (C-AF); manual focus (MF); S-AF + MF; C-AF + MF	Focusing modes
1/4,000th sec	1/4,000th sec	1/4,000th sec	1/4,000th sec	1/4,000th sec	Minimum shutter
30 seconds	30 seconds	30 seconds	60 seconds	60 seconds	Maximum shutter
133.1 x 94.7 x 71.3mm	142 x 101 x 71.5mm	129.5 x 92.5 x 70 mm	140 x 87 x 72mm	129.5 x 91 x 53 mm	Dimensions
Rechargeable NP-FM55H	Rechargeable D-L150 Lithium-ion	AA size (Alkaline, Lithium-ion, Ni-CAD, NiMh)	Rechargeable Lithium-ion pack BLM-1 or 3x CR123A with LBH-1	Rechargeable BLS-1 Lithium-ion	Battery
545g	710g	635g	550g	375g	Weight



Eyestart autofocus; 10.2MP; great battery life.	Excellent images; preview option; 10.2MP	Compact; value; digital preview.	Live view; great image quality; lots of features.	Live view system; easy to use; compact; 10.9MP.	✓
Shutter release position.	Images slightly darker; lacks some beginner features.	Knobs uncomfortable.	A bit slow on startup; single shot speed not fast.	In-camera cropping would be nice; images are soft.	✗
★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	Verdict



BEST TECH



The **Best Value** award is for products which offer a good combination of features for a reasonable price.



The **Best Overall** award is for products we believe are the best, regardless of price.

APC's independent reviewers point to the best technologies in the top-selling product categories each month. We only change products when a better one comes along. What you see here is the best technology available on the market.

Best Tech is edited by William Maher. Contributors to the APC Best Tech guide: Ashton Mills, Nick Race, Tony Sarno, Dan Warne, Chris Zammit and Stephen Withers.

**THE BEST GEAR
IN 50 CATEGORIES!
ONLINE AND IN THE
MAGAZINE**



DESKTOP PCS – GENERAL USE

Ensire Digital Vitesse XP2

- CONTACT Ensire Digital
- ONLINE www.ensiredigital.com.au
- PRICE \$2,687 (our spec)



We specced this machine on the Ensire site, with the right mix of features for work and play. Under the hood is Intel's flagship Core 2 Duo E6600 (2.4GHz) with 1GB of RAM, a Samsung 19in 8ms screen and GeForce 7600GT graphics card. Classy touches include the Logitech MX3000 Cordless Desktop set and 5.1 speakers.



DESKTOP PCS – BUSINESS

Dell OptiPlex 745 mini tower

- CONTACT Dell
- ONLINE www.dell.com.au
- PRICE \$1,635.70 (our spec)



With Intel's new Core 2 Duo onboard, this represents the top of the line in a business computing platform. Key features include a Core 2 Duo E6300 (1.8GHz) chip, 1GB DDR2 RAM, a 160GB Serial ATA hard drive, and 3-year next-business-day on-site warranty. Price includes 17in LCD monitor.



MOTHERBOARDS

ASUS P5N32-E SLI motherboard

- CONTACT ASUS
- ONLINE www.asus.com.au
- PRICE \$379 (P5N32-E SLI); \$349 (SLI)



Motherboards based on Nvidia's 680i chipset are the bees knees for enthusiasts. The P5N32-E SLI includes two 16x PCI Express lanes for Nvidia cards in SLI configuration, support for Core 2 Extreme, Core 2 Duo and Socket 775 processors, automatic overclocking of RAM, and 1,333MHz FSB future processors from Intel.



PC Quest M2 Core

- CONTACT PC Quest
- ONLINE www.pcquest.com.au
- PRICE \$1,510 (our spec)



When it comes to cheap, do-everything machines, there's a lot of rubbish out there from the big brands. Not so with PC Quest. This system has a dual-core Athlon 64 X2 3800+ on AMD's new AM2 platform, plus 1GB of RAM and a 19in LCD. Also, the ATI Radeon x1600 Pro is a capable card for occasional gaming.



Dell Dimension C521

- CONTACT Dell
- ONLINE www.dell.com.au
- PRICE \$1,155 (our spec)



As cheap as anything you'll find with dual-core (though you'll get cheaper with P4), we managed to spec the C521 with an Athlon 64 X2 3800+, 1GB RAM, a 19in LCD and 80GB HDD. The weak point is the integrated graphics: Vista-compliant, but you'll need to turn off the eye candy.

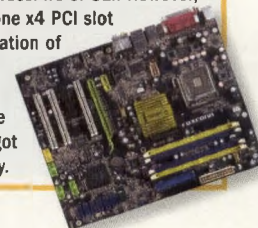


Foxconn P9657AA-8KS2H

- CONTACT Foxconn
- ONLINE www.foxconnchannel.com
- PRICE \$165



This board only has a single x16 PCI Express slot, so it can't be used for CrossFire or SLI. However, it also has one x1 and one x4 PCI slot ready for the next-generation of PCI-E expansion cards. Combine this with HD audio, five SATA and one eSATA port and you've got top value for your money.



VIDEO CARDS

MSi GeForce 8800 GTS 320MB

CONTACT MSI
ONLINE www.msicomputer.com.au
PRICE \$479



There is a pretty big difference between the GTX and the GTS models on paper, but the performance of the much cheaper GTS is still rock-solid. Testing in F.E.A.R. and Quake 4 had the card singing – the GTS 320MB version never slowed or shuddered, even with the system-killing 16xAA turned on.



Nvidia GeForce 7600 GT

CONTACT Nvidia
ONLINE www.nvidia.com
PRICE Approx. \$210



Nvidia's mainstream card, the GeForce 7600 GT raises the bar for price compared to performance. With significant performance boosts over the last-generation 6600 GT card, the 7600 GT also comes with support for SLI, allowing performance to spiral even higher.



LCD MONITORS

HP w1907

CONTACT HP
ONLINE www.hp.com.au
PRICE \$549



It's not the 24in Dell behemoth we featured in April's issue, but for most people, this 19in model is probably a better fit. It was our pick of the glossy screens in May's LCD monitor roundup (see page 52), with a bright, crystal-clear screen and less of the darkened corners seen in some rivals.



Chimei CMV946D

CONTACT Protac
ONLINE www.protac.com.au
PRICE \$299



This is about as cheap as you can get for a 19in wide-screen LCD. Resolution is 1,440 x 900 and image quality is crisp and colours excellent. We found some noise present, but otherwise we didn't find any significant problems. You get D-Sub/DVI-D inputs and a 2ms response time.



OPTICAL DRIVES – DVD

ASUS DRW-1814BLT DVD writer

CONTACT ASUS
ONLINE www.asus.com.au
PRICE \$79



Finally, a retail SATA optical drive! This is a premium drive, running at 18x DVD±RW writing, 8x DVD±R Double Layer and 48x CD writing. Interestingly, it's only rated to read DVDs at 16x (slower than it can write to them). In the box, you get a couple of blank LightScribe-compatible discs, and Nero 6 OEM.



Pioneer DVR-212D

CONTACT Pioneer
ONLINE www.pioneer.com.au
PRICE \$89



Despite the name, the DVR-212D appears to be identical to the DVR-A12XL in terms of specs and features, including firmware upgradeability – only it's a SATA variant instead of IDE as with the DVR-A12XL. That, and it lacks the extensive CyberLink software package, which you don't really need. But as it's SATA and can be found for \$89, it gets the Best Value award.



INTERNAL HARD DISKS

Hitachi Deskstar 7K1000

CONTACT Legend Corporation
ONLINE www.legendcorporate.com
PRICE \$599



This is the world's first 1TB drive available for PCs. APC's Labs Editor Nick Race tested it and said: "It's big storage! Seriously big. And it has the performance of other top drives in the market." Using perpendicular magnetic recording technology and a 32MB cache, this is the new top dog of hard drives.



EXTERNAL HARD DISKS

LaCie Bigger Disk Extreme 2TB

CONTACT LaCie
ONLINE www.lacie.com/au
PRICE \$1,695



So your friend has been boasting about their 1TB external like it's the bee's silicon knees? Pfft – LaCie's latest release packs 2TB into a single device, tossing in three different interface options of FireWire 400, FireWire 800 and USB 2.0. As far as external drives go, it doesn't get bigger than this. For now anyway.



USB ULTRA-PORTABLE

SanDisk Cruzer Micro 4GB U3

CONTACT SanDisk
ONLINE www.sandisk.com
PRICE \$69



A new-generation USB flash drive that, with 4GB of storage, lets you take full advantage of the new U3 storage technology (see Workshop on page 110). You can carry not just data, but also apps, including full suites such as OpenOffice. The Cruzer Micro fits easily in any pocket or keychain and comes with a retractable connector.



Seagate Barracuda 7200.10 320GB

CONTACT Synnex
ONLINE www.synnex.com.au
PRICE \$225



It's quiet and packs plenty of punch, but be careful in tight enclosures: it's hot. Though the RRP for this drive is \$225, they can be found on the street for less than \$200. The 16MB cache model is fast enough for most uses, but if you're serious about video editing, splurge for a 10,000rpm drive.



WD My Book Premium ES 320GB

CONTACT Western Digital
ONLINE www.westerndigital.com
PRICE \$249 (320GB)



The WD My Book products have garnered quite a following. The new Premium ES adds eSATA support to provide greater throughput for external links – up to 300MB/s over USB 2.0's 60MB/s. Sporting some fancily named backup software, the Premium ES is priced well too.



Sandisk Cruzer Micro

CONTACT Sandisk
ONLINE www.sandisk.com
PRICE \$25 (1GB)



Sandisk's Cruzer Micro is top-notch. The simple design includes a retractable USB connector and ships with a lanyard. The key includes the U3 software platform that allows users to install custom apps – just like Lexar's PowerToGo feature. It's a touch slower than its competitor, but it's also \$20 cheaper for the 1GB capacity.





MEDIA ADAPTORS

Zensonic Z500 HD Network DVD

CONTACT Zensonic
 ONLINE www.zensonic.com.au
 PRICE \$569



If you want to get your digital media from the study to the lounge room, the Z500 can handle anything you throw at it. It's a progressive-scan MPEG4/DVD player with HDCP-compatible HDMI, plus built-in Ethernet and 802.11b/g for streaming internet access and playing music, photos and movies from any PC on your home network.



Mediatek MG-350HD

CONTACT Anyware Computers
 ONLINE www.anyware.com.au
 PRICE \$399



The Mediatek MG-350HD is one of the simplest ways to get high-definition action into your lounge room (up to 1,080p resolution). Whack a desktop hard drive inside and the Mediatek plays just about any audio, video or image file you care to throw at it – from the drive or via Ethernet or Wi-Fi.



NAS / SMALL BUSINESS

Adaptec Snap Server 210

CONTACT Adaptec
 ONLINE www.adaptec.com
 PRICE \$2,152 (500GB) inc. software



Unlike big rack-mounted enterprise NAS systems, Adaptec's Snap Server has focused on the smaller end of town. This design has either 500GB or 1TB of networked storage. What sets it apart is the award-winning GuardianOS, giving you features previously reserved for big business.



Adaptec Snap Server 110

CONTACT Adaptec
 ONLINE www.adaptec.com
 PRICE \$999 (160GB) inc. software



Cheaper than the Snap Server 210, this model gives you a business-class network storage box with a single drive (160GB to 500GB) of space on a Gigabit Ethernet connection. Designed to be fast, it incorporates features like block and file date on the same server, plus integration with Windows, Linux, Unix and Apple.



SERVERS – SMALL BUSINESS

PowerEdge 2900

CONTACT Dell
 ONLINE www.dell.com.au
 PRICE From \$3,487



This Dell is a beauty. It's dual-socket, dual-core and sports up to two of the new Intel Woodcrest Xeon. The default config features a single Xeon 5140 at 2.33GHz with 1,333MHz FSB, backed by 2GB of DDR2 533 FB DIMMS and an 80GB SATA II hard drive. Dell offers a 3-year on-site warranty on this hugely upgradable server.



HP ProLiant ML110 G3 SMB Bundle

CONTACT HP
 ONLINE www.hp.com.au
 PRICE \$1,499



Not a real powerhouse, but the price can't be beaten. This unit is a single CPU Pentium 4 3.0GHz with 1GB of RAM and two 80GB hard disk drives. Though it won't break any speed records, it will suit a small business's needs. The server is bundled with Microsoft Small Business Server 2003 Standard Edition.



NOTEBOOKS – MEDIA CENTRE

Toshiba Qosmio G30

CONTACT Toshiba
 ONLINE www.isd.toshiba.com.au
 PRICE \$5,499



Toshiba and Sony have been battling it out for a while now, and now the Qosmio and Vaio VGN-AR behemoths have been updated. Based on the specs, we can't go past the new Qosmio G30 for sheer outright luxury. Why? The G30 now has the advantage in a few key areas, including 320GB, 2GB of RAM and Nvidia GeForce Go 7900.



NOTEBOOKS – PERSONAL

Toshiba A200

CONTACT Toshiba
 ONLINE www.toshiba.com.au
 PRICE From \$2,299



The Toshiba outshone its rivals in our Labs tests with great Core 2 Duo performance and solid battery life. Unlike some heavier rivals, this 15.4in unit is a portable 2.7kg, and for the price it's stacked with features, including a 160GB hard drive, 802.11n networking, fingerprint reader and webcam. It also handles Vista with ease.



NOTEBOOKS – ULTRAPORTABLE

Toshiba Libretto

CONTACT Toshiba
 ONLINE www.isd.toshiba.com.au
 PRICE From \$3,499



You had better make sure to look closely when shopping for a notebook or you might miss this one. At just 7.2in, the display is tiny (and the keyboard matches). Don't be fooled by the chassis though, there's plenty of grunt inside (and you can throw it into your backpack with room to spare).



Acer Aspire 9425WSMi

CONTACT Acer
 ONLINE www.acer.com.au
 PRICE \$2,699



This Acer doesn't have a TV tuner, but it's cheaper than the ASUS it replaces, and comes with 2GB RAM. It's an ideal Vista notebook, with a 17in wide-screen, Core 2 Duo, plenty under the hood and a decent battery life. Graphics are powered by an Nvidia nForce Go 7300 (using 236MB TurboCache, not discrete graphics).



Excel M665N

CONTACT Protac
 ONLINE www.protac.com.au
 PRICE \$1,899



This was the only sub-\$2,000 system in this month's Vista notebook roundup. It's fine for general desktop apps, but 3D performance and battery life aren't great. Considering you're getting a T7200 2GHz Core 2 Duo with 2GB RAM, 120GB drive and Vista Home Premium, this is good value.



Fujitsu LifeBook S6311

CONTACT Fujitsu
 ONLINE www.lifebook.com.au
 PRICE \$2,499



It's bit heavier than the Fujitsu P7230 from last month, but this 1.7kg unit (weighs more with DVD drive) still provides good value. The base platform is probably a better bet for Vista, with Core 2 Duo, 2GB RAM and Intel 945G graphics. You get a 13.3in screen and a 120GB hard drive, plus a two-year warranty.



SMARTPHONES

Blackberry 8707G

- CONTACT Optus
- ONLINE www.optus.com.au
- PRICE \$999 outright (or plans)



We like the new 8800, but, for us, the improved interface and screen don't outweigh the lack of 3G and the cramped keyboard. We're sticking with the 8707G, though the 8800 and Samsung's BlackJack are viable alternatives. We like the 8707G's big screen, fine-tuned keyboard, 3G wireless and email service.



Nokia E61

- CONTACT Nokia
- ONLINE www.nokia.com.au
- PRICE \$749



It's hard to fault Nokia's 3G "BlackBerry Killer": it has the comfortable BlackBerry form factor along with a QWERTY keyboard and fits comfortably in your pocket — plus, you can take your pick of push email service. There are two other killer features: inbuilt Wi-Fi and Nokia's new web browser.



MULTIFUNCTION — HOME

Canon Pixma MP830

- CONTACT Canon
- ONLINE www.canon.com.au
- PRICE \$549



The MP780's successor, the MP830 soundly beats the competition. It can print photo-lab-quality 4 x 6in home snaps and has all the gear needed by a home office, such as a copier, scanner and G3 fax machine (together with an automatic 35-page document feeder and duplexing ability).



Lexmark X5470

- CONTACT Lexmark
- ONLINE www.lexmark.com.au
- PRICE \$249



This Lexmark is probably the first attempt to create a multifunction printer that actually looks stylish. On top of that, the machine also performs well, with print speeds up to 25ppm black and 18ppm colour, a 10-sheet automatic document feeder, plus PC-free photo, fax and copy capabilities.



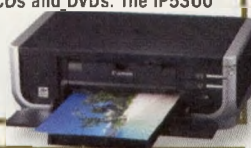
PRINTERS — HOME

Canon PIXMA iP5300 Bubble Jet

- CONTACT Canon
- ONLINE www.canon.com.au
- PRICE \$249



This is the perfect all-rounder for the home. It prints high-quality photos and churns through mono text documents at speeds of up to 31ppm, with quality approaching that of a laser. It can also print directly to CDs and DVDs. The IP5300 will deal with school projects, digital photos, documents, anything!



Epson Stylus C79

- CONTACT Epson
- ONLINE www.epson.com.au
- PRICE \$89



This is a cheap and cheerful printer that still delivers good results. With its four separate ink cartridges and extra-fine printing, it marries good print and photo quality with print speeds of up to 22ppm (black text) and 12ppm (colour). Be aware that your main ongoing cost will be the ink.



PRINTERS — SMALL BUSINESS

OKI C3400 LED Laser

- CONTACT OKI
- ONLINE www.oki.com.au
- PRICE \$878



Essentially a high-performance colour laser for just over \$800. The OKI C3400 surpassed all the other sub-\$1,000 lasers in our last Labs Challenge in print speed and quality because it uses slightly different LED laser technology. Consumable costs are slightly higher because the toner cartridges only do 1,000 pages, but it's a top performer.



Lexmark E120n

- CONTACT Lexmark
- ONLINE www.lexmark.com.au
- PRICE \$188



The outstanding value of this package sent the APC office into raptures. The E120n is a 20ppm mono laser printer, with an Ethernet print server built in, for only \$188. Connect it to your ADSL modem/router and you can print wirelessly from anywhere in the house. Cartridges are not expensive either.



MULTIFUNCTION — BUSINESS

EPSON AcuLaser CX11NF

- CONTACT Epson
- ONLINE www.epson.com.au
- PRICE \$1,499



This colour laser multifunction printer won three of the six tests thrown at several MFPs in APC's Labs Challenge. Has good copy and scan speed, and does a great job with plain paper, where its fine detail and accurate colour impressed the judges. It can really replace your office printer, copier and fax machine.



HP Colour LaserJet CM1017

- CONTACT HP
- ONLINE www.hp.com.au
- PRICE \$1,050



HP's LaserJet CM1017 is HP's entry-level colour laser MFC. Print quality is superb in this ideal, affordable MFC for small businesses needing to produce their own marketing materials. It's also a copier and a scanner and includes media card slots plus manual duplexing, but lacks a fax function, but it's a great laser engine for the price.



ADSL2+ MODEM/ROUTERS

Dynalink RTA1025W

- CONTACT Dynalink
- ONLINE www.dynalink.com.au
- PRICE \$179



This modem is a bargain at \$179. It performed well in our ADSL2+ and wireless tests and was also a strong performer in Annex M tests. The only area for improvement is long-range wireless, where the 1025W only managed 800Kbit/s, but this won't be a significant concern for most people.



Dynalink RTA1046VW

- CONTACT Dynalink
- ONLINE www.dynalink.com.au
- PRICE \$279



Performance is nearly as good as the 1025W, but for your extra \$100 you get two inbuilt VoIP ports for you to connect standard phones to and make two calls at the same time. And if you want the fastest possible modem at 1KM, this is it: 19.85Mbit/s.





WIRELESS APs & ROUTERS

Linksys Wireless-N WRT300N

CONTACT Linksys
ONLINE www.linksys.com.au
PRICE \$279.95



We're still not overly convinced that Draft N devices are the best devices in the long term, but if you want more speed for now, at least it gives you a chance of compatibility between brands and some hope of a firmware upgrade further down the track. The WRT300N has the best range among the Draft N routers we've tested so far.



TP-Link TL-WR541G

CONTACT Anyware
ONLINE www.anyware.com.au
PRICE \$75



In our tests the TL-WR541G delivered solid connections at the same range as routers costing much more. It has the usual four-port 10/100 Ethernet switch plus regular features such as a (relatively simple) firewall, access controls, WPA2 authentication, DHCP and port triggering.



VOIP ADAPTORS

Netcomm V300

CONTACT NetComm
ONLINE www.netcomm.com.au
PRICE \$199



Low upstream speeds on most broadband connections mean QoS support makes a big difference to how you sound during a VoIP call. In APC's testing, the V300 delivered good voice quality with minimum impact on data traffic. It also lets you use one handset for VoIP and PSTN calls.



Netcomm V100

CONTACT NetComm
ONLINE www.netcomm.com.au
PRICE \$128



Connect the V100 to a power point, your network and a handset, and you're in business. Available as a generic model or preconfigured for certain VoIP providers, which makes it as simple as it gets. Some people prefer a box that allows more diddling around with configurations, but we're attracted to the simplicity.



GPS DEVICES

Garmin Nuvi 660

CONTACT GME
ONLINE www.gme.net.au
PRICE \$1,199



As a sat-nav, the Nuvi 660 is the cream of the crop. Stellar 4.3in wide-screen, large buttons and a user-friendly interface make it a breeze to use, and the main navigation screen is clear and uncluttered. Acquiring a GPS signal is speedy thanks to the flip-up antenna, and correcting wrong turns is also snappy.



ASUS S102 PND

CONTACT ASUS
ONLINE www.asus.com.au
PRICE \$549



The ASUS isn't perfect, our tests found it struggled to reroute quickly if we took a wrong turn. Still, we found it was super quick to acquire its initial satellite fix and calculate the initial route. The voice prompts are very helpful as well. You get 2D, 3D and night mode, and the maps are easy to follow, if basic.



DIGITAL SLR CAMERAS

Nikon D80

CONTACT Nikon
ONLINE www.nikon.com.au
PRICE \$1,995



This was our overall winner in this month's DSLR roundup. Great images and fantastic controls will suit everyone from beginners to low-end pros. You get 10.2MP with in-camera editing and pro controls like selectable white balance and an advanced autofocus system. It takes 0.1 sec to start and shoots a very fast 3.3fps.



NEW ENTRY

DIGITAL VIDEO CAMERAS

Panasonic AG-HVX202EN

CONTACT Panasonic
ONLINE www.panasonic.com.au
PRICE \$9,900



The first of the next-generation pro-grade cameras (and inside \$10K). Record in DV or various DVCPRO formats, with support for 720p and 1080i HD. With support for DV tape and the new P2 flash media format, as well as pro audio features and new lensing technology, this is nova hot right now.



PROJECTORS

Optoma HD72

CONTACT Amber Technology
ONLINE www.ambertech.com.au
PRICE \$4,750



Optoma's outstanding DLP-based projector offers full 720p HD resolution for less than \$5,000. The 3.1kg unit produces a clear, consistent image with controls to adjust brightness, contrast, image shift and keystone, through dedicated buttons on the remote control. This helps the viewer adjust the image to match each movie.



Pentax K100D

CONTACT Pentax
ONLINE www.pentax.com.au
PRICE \$99



This is a solid digital SLR for under \$1,000, with anti-shake, full manual control and an 11-point through-the-lens autofocus system. It's 6.1 megapixel, but don't let that put you off. Our tests showed the image quality was well and truly up to scratch. There is a digital depth-of-field preview system, which we found to be handy.



NEW ENTRY

Hitachi Hybrid DZ-HS301

CONTACT Hitachi
ONLINE <http://aus.hitachi.com.au/>
PRICE \$1,449



This is a DVD/HDD combo cam. Hitachi's new hybrid gives you more control over video quality and greater recording times, with up to three hours at DVD quality and six at "standard". You also get in-camera editing before you output to disc, making it perfect for those fearful of editing on a PC.



Dell 1800MP

CONTACT Dell
ONLINE www.dell.com.au
PRICE \$1,398.10



Meet the Dell 1800MP, a DLP machine with XGA resolution and brightness of 2,100 lumens. Its 1,024 x 768 resolution and contrast ratio of 2,000:1 are generally found on higher-priced projectors. Downsides? Slightly louder fan (36db) and butt-ugly design, but who cares when it comes at this great price?



TV TUNERS

Compro VideoMate T750

CONTACT Anyware
ONLINE www.anyware.com.au
PRICE \$149



With pockets of poor digital reception, we're still inclined towards combo analogue/digital tuners. The T750 provides digital and analogue, composite/S-Video capture, FM radio tuner (with MP3, WAV and WMA recording), remote control and Compro's capable software. We especially like its ability to power up and shut down by remote or before/after recording.



Compro VideoMate U500

CONTACT Anyware
ONLINE www.anyware.com.au
PRICE \$99



The Compro VideoMate U500 is a USB dongle, so you can use it with desktops or notebooks (but you may need a better antenna than the one included in order to receive all channels). Scheduled recording is easy enough to set up, plus it's possible to record directly to a DVD or an ISO.



HD TVs

Sony Bravia KDL40X2000

CONTACT Sony
ONLINE www.sony.com.au
PRICE \$5,499



The Bravia is set apart from the competition by its signature styling, featuring a "floating glass" design — this screen looks expensive, and it is. This is full HD resolution of 1,920 x 1,080, unlike some cheaper value screens (see Acer's value range). For the price, you're also getting an integrated HD digital tuner and 2 HDMI inputs.



Acer AT3705-DTV

CONTACT Acer
ONLINE www.acer.com.au
PRICE \$2,899



Sure, this high-definition television isn't a traditional audio-visual brand, but Acer are definitely good value for money. For less than \$3,000 you're getting a 37in full high-definition resolution (1,920 x 1,080) LCD screen including analogue and digital TV tuners.



PERSONAL VIDEO RECORDERS

Topfield TF6000PVRt

CONTACT Topfield
ONLINE www.topfield.com.au
PRICE \$1,249



The addition of Wi-Fi provides wireless downloads of electronic program guides from IceTV, allowing you to record TV shows by name rather than timeslot. This Topfield has dual digital tuners and a 200GB hard drive (was 160GB). It's also now easier to copy files off the unit for playback on your PC.



Foxtel iQ

CONTACT Foxtel
ONLINE www.foxtel.com.au
PRICE \$14.95/mth



Admittedly, the 160GB Foxtel iQ sits awkwardly in the category of PVRs, because it's inextricably tied to Foxtel's Pay TV service. But if you do happen to be a Foxtel subscriber, the 160GB iQ is absolutely worth the money. Foxtel has removed the upfront fee, so it's now just \$14.95 a month.



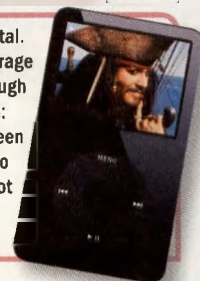
PORTABLE MUSIC PLAYERS

iPod 80GB

CONTACT Apple
ONLINE www.apple.com.au
PRICE \$499



Now this is getting really mental. Truly an insane amount of storage (20,000 songs), which is enough to knock Creative's Zen Vision: off the top of our list. The screen is now brighter and gives up to 20 hours of battery life. It's not cheap, but yet again, Apple's iPod is the best.



iPod shuffle 1GB

CONTACT Apple
ONLINE www.apple.com.au
PRICE \$119



We're not turning into iPod fanboys, but for RRP value we still can't go past the shuffle, which has had a design overhaul and a price cut. It's now so small that fashion models must use their fingertips to hold it in press photos. 1GB of memory gives you up to 240 songs.



IT'S THE FASTEST WAY TO FIND THE BEST PC GEAR IN AUSTRALIA!

APC's Best Tech list is online at
www.apcmag.com/BestTech

We got sick of our neighbours/brothers/cousins bugging us for info about the best gear to buy, so we've posted it all online: our favourite killer products across 50 categories.

Get all our inside tips on the best notebooks, LCD TVs, modems, printers and more.

\$0 BROADBAND SETUP

WITH 18 MONTH CONTRACT

ADSL2+



\$29.99
From MONTHLY INC. GST

SUPERFAST INTERNET

Plan	Xlite	Light	Medium	Heavy	Premium Plus	15GB with VoIP
Monthly Download Quota	600MB~	3GB*	18GB*	30GB*	100GB*	15GB*
Shaping (kbps)	64/64	64/64	128/128	128/128	256/256	128/128
Monthly Charge	\$29.99	\$39.99	\$49.99	\$59.99	\$129.99	\$49.99

~ After 600MB monthly download quota reached, excess download charge is 15c/MB and capped at \$30. Speed is shaped when 10GB is reached. *Speed is shaped when monthly download quota is reached. Total minimum cost over 18 month contract term for Xlite plan is \$539.82 (includes \$0 setup but excludes modem cost). Prices are subject to change without notice. Check TPG website at www.tpg.com.au for full terms and conditions. TPG Internet Pty Ltd 65 Waterloo Rd. North Ryde NSW 2113. ABN 15 068 383 737.



Register online at www.tpg.com.au or call 1300 360 855

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- Modem included

\$199.00
From MONTHLY INC. GST

TPG SHDSL is only available at specified TPG ADSL2+ enabled exchanges. † Speed subject to but not limited to distance from local exchange and quality of phone line. Total minimum cost over 24 month contract period for 1Mbps/1Mbps (2 wire) plan is \$5,575 (includes \$799 setup fee and free modem); for 2Mbps/2Mbps (2 wire) is \$10,375 (includes \$799 setup fee and free modem).



Optus admits to broadband network problem

A bug in Optus' \$150 million ADSL2+ network is preventing certain modem brands from connecting, *Dan Warne* reports.

Optus has admitted that the Huawei hardware running its ADSL2+ broadband network "does not support" certain brands of modems. Worse, if a user tries to connect with one of the modems, it will lock up the user's port at the exchange, requiring a manual reset by Optus technical staff.

The fault is known to affect Optus' DSLAMs when current-model Dynalink modems (RTA1025W, RTA1320 and RTA1045VW) as well as certain NetComm modems (NB9W, NB6) attempt to connect. The modems are based on the Broadcom BCM6348 chipset.

The modems' maker, NetComm, claims there is nothing wrong with the modems and blames a bug in the Huawei DSLAM firmware and, in particular, the line cards installed into the DSLAMs by Optus, which are based on an Infineon chipset.

NetComm (owner of both the NetComm and Dynalink modem

brands in Australia) expressed frustration with the lack of resolution from Optus to date.

"Dynalink's ADSL2+ modems adhere to all relevant Australian and international specifications and standards," said NetComm's Danny Morrison. "They were also recently tested by Telstra and listed as approved ADSL equipment, having passed IP1149 testing."

"Accordingly, Dynalink's ADSL2+ modems are compatible with most DSLAMs in the market, assuming they also adhere to these standards."

"A similar interoperability issue was previously identified by a major Taiwanese telco and was resolved by upgrading their ADSL2+ DSLAMs to a new revision of firmware. A similar DSLAM firmware solution has been provided to Optus and it is understood that they are now planning an upgrade to the affected DSLAMs, but this is likely to take several months to complete."

Customers can resolve the problem temporarily by locking the modem to ADSL or ADSL2 mode (not ADSL2+); however, since Optus does not offer an ADSL2 line profile on its DSLAMs, the maximum speed will be 8Mbit/s.

Optus sells its ADSL2+ service on a wholesale basis to a number of popular ISPs including Exetel, Westnet and Netspace. Exetel was recently forced to suspend sales of Optus-based ADSL2+ connections because of the Optus incompatibilities with the NetComm and Dynalink modems.

An Optus spokesperson issued a terse statement in response to a number of questions put to the company by APC: "Optus does not support the Dynalink modem, we do offer a range of modems that are subject to ongoing testing and approved to work on the Optus broadband network."

in brief

USB HSDPA

Mobile network 3 is now offering a USB dongle for its mobile broadband service. It is the same Huawei E220 device that Optus and Vodafone are using, but the difference is that 3 is offering them free with a 24-month (1GB/\$49 per month) contract. Although 3 is also offering a PCMCIA card and ExpressCard for newer laptops under the same deal, it says the USB dongle is the best option for people who want to be able to connect their wireless internet to any PC — desktop or laptop.



your monthly broadband guide

APC is proud to partner with the independent broadband price-monitoring service Broadband Choice (broadbandchoice.com.au) to bring you the best ADSL and cable deals.

The comparison table on the following pages focuses on internet service providers that best serve the majority of APC readers' needs — those that have national coverage (though we have included some ISPs that provide higher than 2Mbit/s speed services in limited areas).

Only those meeting at least three of our four plan selection criteria are listed:

Budget plan: cheapest deal under \$35/month.

Light plan: cheapest deal under \$60/month, with at least 512Kbit/s speed and 1GB data.

Family plan: largest download allowance under \$80/month, at least 512Kbit/s and 10GB data.

High-speed: cheapest 1.5Mbit/s plan under \$100/month, with 10GB data minimum.

If an ISP has "unlimited downloads" but speed is throttled after reaching a certain limit, the portion in which you can get full-speed downloads is listed as its limit.

APC has picked the lowest price for a contract period of six months or less for broadband installation. Otherwise, the lowest-priced option was selected.

The installation price doesn't include a modem because you may find you'll get better value by buying one separately.

Can't find your provider in our list? That's because some of the largest ISPs, and many smaller ones, didn't meet the selection criteria. There may be ISPs we didn't list that will provide better deals (but which only service your local area or state).

ISPs enter their own information into the Broadband Choice database. ISPs can contact bc@whirlpool.net.au for more details on how to become part of the database.

Data for our table was extracted from the Broadband Choice database on 30 May 2007.

WE'LL SHELVES OUR FIBRE PLAN AGAIN: TELSTRA

Telstra has wound up the rhetoric yet again about its on-again-off-again fibre broadband plan. Telstra's public policy chief Phil Burgess told ABC Radio that the plan simply would not go ahead without government concessions: "If it's not on the table it'll be on the shelf, and if somebody wants a look at it we'll pull it off the shelf and let them look at it — and if they decide they want to take the steps that are necessary to enable it, we will have a public undertaking where the entire public can look at it and decide if they want to implement it."



Name	Online	Budget plan (under \$35)	Light plan (under \$60, at least 512Kb/s, minimum 1GB data limit)	Family plan (under \$80, at least 512Kb/s, minimum 1GB data limit)	High-speed plan (under \$100, at least 1.5Mb/s, minimum 10GB data limit)	National	Spam filtering	Setup fee and contract length	Rapid transfer
Super-fast broadband ISPs (faster than 1.5Mb/s)									
Comcon ADSL2+	www.comcon.com.au	\$29.95† 1GB+ 24Mb/s	\$29.95† 1GB+ 24Mb/s	\$69.95† 40GB 24Mb/s	\$59.95† 20GB 24Mb/s	✗	✓	\$50 12mths	✗
Dodo ADSL2+	www.dodo.com.au	\$29.90† 1GB+ 24Mb/s	\$29.90† 1GB+ 24Mb/s	\$59.90† 20GB+ 24Mb/s	\$49.90† 10GB+ 24Mb/s	✓	✓	\$1.95 \$99 12mths	✗
Green Tree Frog ADSL 2+ Phone	www.greentreefrog.net.au	\$29.95† 2GB 24Mb/s	\$29.95† 2GB 24Mb/s	\$66† 20GB 24Mb/s	\$66† 20GB 24Mb/s	✗	✓	\$165 12mths	✗
iNet broadband2+ ADSL (24Mbit)	www.inet.net.au	\$29.95† 500MB+ 24Mb/s	\$39.95† 2GB+ 24Mb/s	\$69.95† 20GB+ 24Mb/s	\$59.95† 10GB+ 24Mb/s	✗	✓	\$79.95 6mths	✗
Internode Extreme ADSL2+	www.internode.on.net	N/A	\$59.95 20GB 24Mb/s	\$79.95 40GB 24Mb/s	\$59.95 20GB 24Mb/s	✗	✓	\$129 6mths	✗
Koala ADSL 2+	www.koalatelecom.com.au	\$34.95† 500MB 24Mb/s	\$44.95† 5GB 24Mb/s	\$74.95† 50GB 24Mb/s	\$49.95† 10GB 24Mb/s	✓	✓	\$149.95 6mths	✗
Letsgo Go ADSL2+ 24Mbit	www.letsgo.com.au	N/A	\$39.95† 60GB 24Mb/s	\$39.95† 60GB 24Mb/s	\$39.95† 60GB 24Mb/s	✗	✓	\$99 12mths	✗
Matilda Internet aDSL2+	www.matilda.net.au	N/A	\$59.95† 1GB 24Mb/s	\$79.95† 20GB+ 24Mb/s	\$69.95† 10GB+ 24Mb/s	✓	✓	\$55 1mth	✗
Netspace Home ADSL2+	www.netspace.net.au	N/A	\$39† 5GB+ 24Mb/s	\$69† 20GB+ 24Mb/s	\$49† 10GB+ 24Mb/s	✗	✓	\$99 6mths	✗
Netspace SONO ADSL2+	www.netspace.net.au	N/A	\$49.95† 5GB 24Mb/s	\$79.95† 20GB 24Mb/s	\$59.95† 10GB 24Mb/s	✗	✓	\$99 6mths	✗
OptusNet Cable	http://personal.optus.com.au	\$29.95† 300MB+ 9.77Mb/s	\$39.95† 2GB+ 9.77Mb/s	\$69.95† 20GB+ 9.77Mb/s	\$69.95† 20GB+ 9.77Mb/s	✗	✓	\$89 12mths	✗
OptusNet DSL Direct	http://personal.optus.com.au	\$29.95† 300MB+ 24Mb/s	\$39.95† 2GB+ 24Mb/s	\$69.95† 20GB+ 24Mb/s	\$69.95† 20GB+ 24Mb/s	✗	✓	\$89 12mths	✗
Primus up to 8000Kbps Spin ADSL2+	www.primus.com.au	\$29.95† 1GB 8Mb/s	\$29.95† 1GB 8Mb/s	\$69.95† 20GB 8Mb/s	\$59.95† 10GB 8Mb/s	✗	✓	\$118 1mth	✓
Spin ADSL2+	www.spin.net.au	\$29.95† 1GB+ 24Mb/s	\$29.95† 1GB+ 24Mb/s	\$69.95† 40GB 24Mb/s	\$59.95† 20GB 24Mb/s	✗	✓	\$50 12mths	✗
Telstra BigPond Cable	www.bigpond.com	\$29.95† 200MB 8Mb/s	\$59.95† 12GB 8Mb/s	\$59.95† 12GB 8Mb/s	\$59.95† 12GB 8Mb/s	✗	✓	\$2.50 \$189 12mths#	✗
TPG Residential ADSL2+	www.tpg.com.au	\$29.99† 600MB 24Mb/s	\$39.99 3GB 24Mb/s	\$59.99 30GB 24Mb/s	\$49.99 18GB 24Mb/s	✗	✓	\$59.95 12mths	✗
Westnet Broadband2+	www.westnet.com.au	\$29.95† 500MB 24Mb/s	\$39.95† 2GB+ 24Mb/s	\$69.95† 10GB+ 24Mb/s	\$69.95† 10GB+ 24Mb/s	✗	✓	\$0.83 \$139 12mths	✗
Yourhub Real Residential ADSL 2+	www.yourhub.com.au	N/A	\$39† 5GB 24Mb/s	\$59† 15GB 24Mb/s	\$49† 10GB 24Mb/s	✓	✓	\$1 \$180 12mths	✗
Yourhub Real Corporate ADSL 2+	www.yourhub.com.au	N/A	\$60† 5GB 24Mb/s	\$80† 15GB 24Mb/s	\$70† 10GB 24Mb/s	✓	✓	\$1 \$180 12mths	✗

Regular broadband ISPs (1.5Mb/s or less)

.Netcall ADSL (Bundled)	www.netcall.com.au	\$24.90† 768MB+ 256Kb/s	\$34.90† 10GB+ 512Kb/s	\$74.90† 48GB+ 1.5Mb/s	\$44.90† 15GB+ 1.5Mb/s	✓	✓	\$145 12mths	✓
.Netcall ADSL (Unbundled)	www.netcall.com.au	\$29.90† 768MB+ 256Kb/s	\$39.90† 10GB+ 512Kb/s	\$79.90† 48GB+ 1.5Mb/s	\$49.90† 15GB+ 1.5Mb/s	✓	✓	\$145 12mths	✓
anNet ADSL (Unbundled)	www.aanet.com.au	\$29.90† 768MB+ 256Kb/s	\$39.90† 10GB+ 512Kb/s	\$79.90† 48GB+ 1.5Mb/s	\$49.90† 15GB+ 1.5Mb/s	✓	✗	\$145 12mths	✓
anNet ADSL (Bundled)	www.aanet.com.au	\$24.90† 768MB+ 256Kb/s	\$34.90† 10GB+ 512Kb/s	\$74.90† 48GB+ 1.5Mb/s	\$44.90† 15GB+ 1.5Mb/s	✓	✗	\$145 12mths	✓
AAPT ADSL	www.aapt.com.au	\$29† 500MB 256Kb/s	\$39† 12GB 512Kb/s	\$49† 15GB 1.5Mb/s	\$49† 15GB 1.5Mb/s	✓	✓	\$0 1mth	✓
Accsoft Freeway ADSL	www.onmyweb.net	N/A	\$52.95 1.5GB 512Kb/s	\$75.95 15GB 512Kb/s	\$98.95 10GB 1.5Mb/s	✓	✓	\$132 6mths	✓
AlwaysONLINE ADSL	www.alwaysonline.net.au	\$29.95† 500MB 256Kb/s	N/A	\$75† 12GB 1.5Mb/s	\$75† 12GB 1.5Mb/s	✓	✓	\$100 6mths	✓
Aspark ADSL	www.aspark.com.au	N/A	\$53.95† 25GB 512Kb/s	\$53.95† 25GB 512Kb/s	\$99.95† 35GB 1.5Mb/s	✓	✓	\$110 1mth	✓
AuNix Broadband	www.aunix.com.au	\$24.95† 200MB 256Kb/s	\$39.95† 25GB 512Kb/s	\$74.95† 35GB 1.5Mb/s	\$74.95† 35GB 1.5Mb/s	✓	✓	\$89 6mths	✓
Aussiewide Residential ADSL	www.aussiewide.com	N/A	\$59.95 30GB 512Kb/s	\$59.95 30GB 512Kb/s	\$99 30GB 1.5Mb/s	✓	✓	\$110 6mths	✓
Australia On Line ADSL	www.australiaonline.net.au	\$24.95† 200MB 256Kb/s	\$39.95 2GB 512Kb/s	\$79.95 20GB 1.5Mb/s	\$64.95 10GB 1.5Mb/s	✓	✓	\$99 6mths	✓
Australis Internet ADSL	www.australis.net	\$24.95† 200MB 256Kb/s	\$49.95 5GB 512Kb/s	\$54.95 30GB+ 512Kb/s	\$59.95 30GB+ 1.5Mb/s	✓	✓	\$139 1mth	✓
Beagle Internet ADSL	www.beagle.com.au	\$19.95† 200MB 256Kb/s	\$45.95 5GB 512Kb/s	\$57.95 30GB 512Kb/s	N/A	✓	✓	\$157 1mth	✓
BIT.net	www.bit.net.au	\$19.95† 2GB 256Kb/s	\$29.95† 2GB 512Kb/s	\$69.95† 40GB 512Kb/s	\$59.95† 10GB 1.5Mb/s	✓	✓	\$132 6mths	✓
BKB Internet Home ADSL	www.bkb.net.au	N/A	\$49.95 1GB+ 512Kb/s	\$64.95 10GB+ 512Kb/s	\$89.95 10GB+ 1.5Mb/s	✓	✓	\$139 6mths	✓
Blackstump ADSL	www.blackstump.net.au	\$19.95† 200MB 256Kb/s	\$44.95† 5GB 512Kb/s	\$55.95† No limit 512Kb/s	\$72.45† 10GB 1.5Mb/s	✓	✓	\$108 6mths	✓
Bluemaxx ADSL	www.bluemaxx.net.au	\$24.95† 200MB 256Kb/s	\$54.95 5GB 512Kb/s	\$74.95 10GB 1.5Mb/s	\$84.95 10GB 1.5Mb/s	✓	✓	\$105 12mths	✓
Broadband Anywhere ADSL	www.broadbandanywhere.com.au	N/A	\$39.95 5GB+ 512Kb/s	\$69.95 40GB+ 512Kb/s	\$69.95 10GB+ 1.5Mb/s	✓	✓	\$132 12mths	✓
BBi Flat Rate DSL	www.brownbear.net.au	\$32.95 2GB 256Kb/s	\$39.95 2GB 512Kb/s	\$74.95 60GB 512Kb/s	\$59.95 10GB 1.5Mb/s	✓	✓	\$119 6mths	✓
BBi Excess DSL	www.brownbear.net.au	\$32.95† 2GB 256Kb/s	\$39.95† 2GB 512Kb/s	\$74.95† 60GB 512Kb/s	\$59.95† 10GB 1.5Mb/s	✓	✓	\$119 6mths	✓
Brown Bear DSL/Phone	www.brownbear.net.au	\$19.95† 1GB 256Kb/s	\$29.95† 1GB 512Kb/s	\$69.95† 60GB 512Kb/s	\$59.95† 15GB 1.5Mb/s	✓	✓	\$119 6mths	✓
Bullet ADSL	www.bullet.net.au	\$34.95† 500MB 256Kb/s	\$49.95† 5GB 512Kb/s	\$69.95† 25GB 512Kb/s	N/A	✓	✓	\$150 12mths	✓
Central Coast Internet ADSL	www.cci.net.au	\$34.95† 500MB 256Kb/s	\$54.95† 1GB 512Kb/s	\$64.95† 10GB 512Kb/s	N/A	✓	✓	\$132 6mths	✓
Chariot ADSL	www.chariot.net.au	\$29.95† 500MB 256Kb/s	\$39.95 2GB 512Kb/s	\$59.95 40GB 512Kb/s	\$69.95 25GB 1.5Mb/s	✓	✓	\$110 6mths	✓
Comcon Internet ADSL	www.comcon.com.au	\$19.95† 300MB 256Kb/s	\$29.95† 2GB+ 512Kb/s	\$59.95† No limit 512Kb/s	\$49.95† 15GB 1.5Mb/s	✓	✓	\$99 6mths	✓
Comstech Systems ADSL	www.comstech.com.au	\$33.95 500MB 256Kb/s	\$46.50 3GB 512Kb/s	\$72.50 50GB 512Kb/s	\$61.95† 10GB 24Mb/s	✓	✓	\$133.95 6mths	✓
Concept Networks ADSL	www.conceptual.net.au	\$29.95† 500MB 256Kb/s	\$39.95† 1GB 512Kb/s	\$69.95 30GB 512Kb/s	\$69.95† 15GB 1.5Mb/s	✓	✓	\$99 6mths	✓
Connexus Home ADSL	www.connexus.net.au	\$27.95† 200MB+ 256Kb/s	N/A	\$64.95 12GB+ 512Kb/s	\$79.95 12GB+ 1.5Mb/s	✓	✓	\$149 6mths	✓
CyberOne ADSL	www.cyberone.com.au	\$19.95† 200MB 256Kb/s	\$39.95† 1GB 512Kb/s	\$64.95† No limit 512Kb/s	\$74.95† 15GB+ 1.5Mb/s	✓	✓	\$99 1mth	✓
Cyberspace Internet ADSL	www.cyberspace.net.au	\$21.95† 200MB 256Kb/s	\$46.95† 5GB 512Kb/s	\$57.95† No limit 512Kb/s	\$79.95† 10GB 1.5Mb/s	✓	✓	\$99 6mths	✓
DCSI	www.dcsi.net.au	\$32.95 500MB 256Kb/s	\$49.95 10GB 512Kb/s	\$59.95 20GB 512Kb/s	\$69.95 20GB 1.5Mb/s	✓	✓	\$125 6mths	✓
Diamond Telecom ADSL	www.diamondtelecom.com.au	N/A	\$54.95† 25GB 512Kb/s	\$54.95† 25GB 512Kb/s	\$89.95† 35GB 1.5Mb/s	✓	✗	\$80 6mths	✓
DigiPlus	www.digipius.com.au	\$29.95† 10GB 256Kb/s	\$42.95† 5GB 512Kb/s	\$49.95† 10GB 512Kb/s	\$89.95† 10GB 1.5Mb/s	✓	✗	\$99 1mth	✓
Dodo ADSL	www.dodo.com.au	\$29.90† 1GB+ 256Kb/s	\$39.90† 1GB+ 1.5Mb/s	\$79.90† 20GB+ 8Mb/s	\$59.90† 15GB+ 1.5Mb/s	✓	✓	\$1.90 \$99 6mths	✓
DragNet ADSL	www.dragnet.net.au	\$29.95† 200MB+ 256Kb/s	\$45.95† 1.5GB 512Kb/s	\$69.95 15GB 512Kb/s	\$79.95 15GB 1.5Mb/s	✓	✓	\$119 6mths	✓

Name	Online	Budget plan (under \$35)	Light plan (under \$60, at least 512Kbit/s, minimum 1GB data limit)	Family plan (under \$80, at least 512Kbit/s, minimum 10GB data limit)	High-speed plan (under \$100, at least 1.5Mbit/s, minimum 10GB data limit)	National	Spam filtering	Setup fee and contract length	Rapid transfer
Regular broadband ISPs (1.5Mbit/s or less)									
Ecomtel ADSL	www.ecomtel.com.au	\$24.90† 300MB 256Kb/s	\$54.90† No limit 512Kb/s	\$54.90† No limit 512Kb/s	\$69.90† No limit 1.5Mb/s	✓	✓	\$120 1mth	✓
EFTel ADSL	http://w3.eftel.com	\$19.95† 500MB 256Kb/s	\$39.95† 2GB 512Kb/s	\$59.95† 25GB+ 512Kb/s	\$69.95† 25GB+ 1.5Mb/s	✓	✓	\$125 12mths	✓
Fonebox ADSL Broadband Internet	www.fonebox.com.au	\$29.90* 200MB 256Kb/s	\$49.90 5GB 512Kb/s	\$79.90 30GB 512Kb/s	\$79.90 10GB 1.5Mb/s	✓	✓	\$99 6mths	✓
Green Tree Frog ADSL	www.greentreefrog.net.au	N/A	\$55 40GB 512Kb/s	\$77 100GB 512Kb/s	\$99 80GB 1.5Mb/s	✓	✓	\$132 6mths	✓
Green Tree Frog Business ADSL	www.greentreefrog.net.au	N/A	\$55* 40GB 512Kb/s	\$77* 100GB 512Kb/s	\$99* 80GB 1.5Mb/s	✓	✓	\$132 6mths	✓
Hande Communications ADSL - Shaped	www.hande.net.au	\$32.95 500MB+ 256Kb/s	\$44.95 1.5GB+ 512Kb/s	\$79.95 30GB+ 512Kb/s	\$84.95 10GB+ 1.5Mb/s	✓	✓	\$119.95 1mth	✓
Hande Communications ADSL - Usage Based	www.hande.net.au	\$32.95* 500MB+ 256Kb/s	\$44.95* 1.5GB+ 512Kb/s	\$69.95* 15GB+ 512Kb/s	\$89.95* 15GB+ 1.5Mb/s	✓	✓	\$119.95 1mth	✓
HugoNet Home ADSL Broadband	www.hugonet.com.au	\$29.95* 250MB+ 256Kb/s	\$49.95* 1GB+ 512Kb/s	\$69.95 25GB+ 512Kb/s	\$79.95 20GB+ 1.5Mb/s	✓	✓	\$110 12mths	✓
IF Com ADSL	www.ifcom.com.au	\$24.95† 200MB 256Kb/s	\$49.95† 25GB 512Kb/s	\$49.95† 25GB 512Kb/s	\$84.95† 35GB 1.5Mb/s	✓	✓	\$99 12mths	✓
Infinity Plus Residential DSL	www.infinityplus.net.au	N/A	\$54.95† 25GB 512Kb/s	\$54.95† 25GB 512Kb/s	\$84.95† 30GB 1.5Mb/s	✓	✓	\$100 6mths	✓
ISP ADSL	http://w3.isp.net.au	\$33* 1GB 256Kb/s	\$42.90* 5GB 512Kb/s	\$77 No limit 512Kb/s	\$69.30* 25GB 1.5Mb/s	✓	✓	\$120 6mths	✓
IntegrityNet ADSL	www.integritynet.com.au	\$29.95* 200MB 256Kb/s	\$59.95* 5GB 512Kb/s	\$69.95* 10GB 512Kb/s	\$99.95* 10GB 1.5Mb/s	✓	✓	\$139 12mths	✓
Internet Information Group ADSL	www.iig.com.au	N/A	\$59* 5GB 512Kb/s	\$79* 15GB 512Kb/s	\$99* 15GB 1.5Mb/s	✓	✓	\$120 12mths	✓
Internode Home ADSL	www.internode.on.net	N/A	\$39.95 8GB 512Kb/s	\$69.95 40GB 512Kb/s	\$49.95 10GB 1.5Mb/s	✓	✓	\$129 6mths	✓
Internode SOHO ADSL	www.internode.on.net	N/A	\$59.95 10GB 512Kb/s	\$69.95 20GB 512Kb/s	\$69.95 10GB 1.5Mb/s	✓	✓	\$129 6mths	✓
Interworks ADSL	www.interworks.net.au	\$34.95* 1GB 256Kb/s	\$49.95* 5GB 512Kb/s	\$79.95 No limit 512Kb/s	\$99.95* 25GB 1.5Mb/s	✓	✓	\$119 3mths	✓
ISage Internet ADSL	www.isage.aunz.net	\$24.95* 200MB 256Kb/s	\$44.95 25GB+ 512Kb/s	\$79.95 35GB+ 1.5Mb/s	\$76.95† 15GB+ 8Mb/s	✓	✓	\$99 6mths	✓
Ispace ADSL	www.ispace.net.au	\$29.95* 200MB 256Kb/s	\$49.95 5GB 512Kb/s	\$79.95 60GB 512Kb/s	\$79.95 15GB 1.5Mb/s	✓	✓	\$120 6mths	✓
ITEL ADSL	www.itel.net	\$34.95† 4GB 256Kb/s	\$49.95† 4GB 512Kb/s	\$54.95† 60GB 512Kb/s	\$79.95† 60GB 1.5Mb/s	✓	✓	\$129 12mths	✓
ADSL Broadband	www.itginternet.net.au	\$31.79* 200MB 256Kb/s	\$54.89 5GB 512Kb/s	\$65.89 30GB 512Kb/s	\$76.89 15GB 1.5Mb/s	✓	✓	\$95 6mths	✓
Jazinet ADSL	www.jazinet.net	N/A	\$49.50 25GB 512Kb/s	\$49.50 25GB 512Kb/s	\$88 35GB 1.5Mb/s	✓	✓	\$110 1mth	✓
Jump Internet ADSL	http://jumpnet.com.au	\$30* 200MB 256Kb/s	\$50* 2GB 512Kb/s	\$80 30GB 512Kb/s	\$80 15GB 1.5Mb/s	✓	✗	\$0 12mths	✓
Koala ADSL	www.koalatelecom.com.au	\$29.95† 500MB 256Kb/s	\$39.95† 3GB 512Kb/s	\$64.95† 50GB 512Kb/s	\$49.95† 10GB 1.5Mb/s	✓	✓	\$129.95 6mths	✓
Lets Go ADSL	www.letsgo.com.au	N/A	\$59.95 30GB 512Kb/s	\$59.95 30GB 512Kb/s	\$79.95 30GB 1.5Mb/s	✓	✓	\$99 6mths	✓
Lizzy ADSL	www.lizzy.com.au	\$24.95* 200MB 256Kb/s	\$39.95 2GB 512Kb/s	\$79.95 20GB 1.5Mb/s	\$64.95 10GB 1.5Mb/s	✓	✓	\$99 6mths	✓
Lucidity Communications ADSL	www.lucidity.net.au	N/A	\$59.95† 25GB 512Kb/s	\$79.95† 35GB 1.5Mb/s	\$79.95† 35GB 1.5Mb/s	✓	✓	\$120 1mth	✓
Matilda Internet DSL	www.matilda.net.au	\$29.95* 200MB 256Kb/s	\$49.95* 1GB 512Kb/s	\$59.95 10GB+ 512Kb/s	\$69.95 10GB+ 1.5Mb/s	✓	✓	\$110 1mth	✓
McPherson Media ADSL	www.mcmedia.com.au	\$29.95* 200MB+ 256Kb/s	\$49.95* 3GB+ 512Kb/s	\$79.95* 25GB+ 512Kb/s	\$89.95* 10GB+ 1.5Mb/s	✓	✓	\$99 12mths	✓
Midcoast Internet DSL	www.midcoast.com.au	\$28.50* 200MB+ 256Kb/s	N/A	\$71.50* 10GB+ 512Kb/s	\$98* 10GB+ 1.5Mb/s	✓	✓	\$99 6mths	✓
Netspace Home ADSL	www.netspace.net.au	\$29.95* 300MB 256Kb/s	\$29.95† 1GB+ 512Kb/s	\$69.95† 20GB+ 1.5Mb/s	\$54.95† 10GB+ 1.5Mb/s	✓	✓	\$99 6mths	✓
Netspace SOHO ADSL	www.netspace.net.au	N/A	\$49.95† 15GB 512Kb/s	\$79.95† 20GB 1.5Mb/s	\$64.95† 10GB 1.5Mb/s	✓	✓	\$99 6mths	✓
NetSpeed ADSL	www.netspeed.com.au	\$19.95† 200MB 256Kb/s	\$34† 1GB+ 512Kb/s	\$74† 30GB+ 512Kb/s	\$74† 10GB+ 1.5Mb/s	✓	\$2	\$139 12mths	✓
North Queensland Telecom ADSL	www.nqtelecom.com.au	\$24.95* 200MB 256Kb/s	\$49.95* 1GB 1.5Mb/s	\$54.95 25GB 512Kb/s	\$89.95 35GB 1.5Mb/s	✓	✓	\$99 1mth	✓
Optraweb ADSL	www.optraweb.com.au	N/A	\$44.95 5GB 512Kb/s	\$74.95 60GB 512Kb/s	\$81.95 15GB 1.5Mb/s	✓	✓	\$129 6mths	✓
Optraweb Excess DSL	www.optraweb.com.au	\$32.95* 2GB 256Kb/s	\$39.95* 2GB 512Kb/s	\$74.95* 60GB 512Kb/s	\$81.95* 15GB 1.5Mb/s	✓	✓	\$129 6mths	✓
Optraweb Bundle DSL	www.optraweb.com.au	\$27.95† 2GB 256Kb/s	\$34.95† 2GB 512Kb/s	\$69.95† 60GB 512Kb/s	\$80.95† 15GB 1.5Mb/s	✓	✓	\$129 6mths	✓
Ozefone Digital	www.ozefone.com	\$34.50* 1GB 256Kb/s	\$44.50* 2GB 512Kb/s	N/A	\$89.50* 10GB 1.5Mb/s	✓	✓	\$129 6mths	✓
OzISP ADSL	www.ozisp.com.au	N/A	\$48.40 1.5GB 512Kb/s	\$79.75 30GB 512Kb/s	\$93.50 15GB 1.5Mb/s	✓	✓	\$132 6mths	✓
Pacific Internet DSL	www.pacific.net.au	\$29.95* 250MB 256Kb/s	\$39.95 1GB 512Kb/s	\$54.95 No limit 512Kb/s	\$49.95† 10GB 1.5Mb/s	✓	✓	\$99 6mths	✓
Primus Flexible Broadband	www.primus.com.au	\$24.95† 500MB 256Kb/s	\$34.95† 1GB 512Kb/s	\$69.95† 20GB 1.5Mb/s	\$59.95† 12GB 1.5Mb/s	✓	✓	\$118 1mth	✓
Quantum ADSL	www.quantumtelecom.com.au	N/A	\$49.95† 25GB 512Kb/s	\$79.95† 35GB 1.5Mb/s	\$79.95† 35GB 1.5Mb/s	✓	✓	\$140 1mth	✓
Rabbit Internet ADSL	http://rabbit.com.au	\$27.95† 200MB 256Kb/s	\$34.90† 1GB 512Kb/s	\$80† 60GB 1.5Mb/s	\$59† 10GB 1.5Mb/s	✓	✓	\$104.50 6mths	✓
Rapid Net ADSL	www.rapidnet.com.au	\$34.95 500MB 256Kb/s	\$44.95 5GB 512Kb/s	\$49.95 15GB 512Kb/s	\$79.95 12GB 1.5Mb/s	✓	✓	\$109 6mths	✓
Realcom ADSL	www.realcomaustr.com.au	\$27.95* 200MB 256Kb/s	\$54.95 25GB 512Kb/s	\$54.95 25GB 512Kb/s	\$94.95 35GB 1.5Mb/s	✓	✓	\$0 12mths	✓
REEDS.NET Internet Services ADSL	www.reeds.net.au	N/A	\$49 25GB 512Kb/s	\$79.95 35GB 1.5Mb/s	\$79.95 35GB 1.5Mb/s	✓	✓	\$99 6mths	✓
Saco Technology ADSL	www.sacotech.com.au	N/A	\$45.95† 2GB 512Kb/s	\$75.95† 60GB 512Kb/s	\$74.95† 15GB 1.5Mb/s	✓	✓	\$129.95 6mths	✓
SimpliciTi ADSL	www.simpliciti.com.au	\$31 500MB 256Kb/s	\$47 5GB 512Kb/s	\$57 30GB 512Kb/s	\$87 10GB 1.5Mb/s	✓	✓	\$99 3mths	✓
Skyways ADSL	www.skyways.net.au	\$29.95* 200MB 256Kb/s	\$49.95* 10GB 512Kb/s	\$69.95 No limit 512Kb/s	\$99.95 30GB 1.5Mb/s	✓	✓	\$109 12mths	✓
Skyways DSL + Phone	www.skyways.net.au	\$29.95† 5GB 256Kb/s	\$39.95† 10GB 512Kb/s	\$59.95† No limit 512Kb/s	\$89.95† 30GB 1.5Mb/s	✓	✓	\$109 6mths	✓
Snowynet ADSL	www.snowy.net.au	\$29.90* 200MB+ 256Kb/s	N/A	\$69.90 No limit 512Kb/s	\$99.90 No limit 1.5Mb/s	✓	✓	\$110 6mths	✓
B Digital ADSL	www.mysoil.com.au	\$29.95 No limit 256Kb/s	\$44.95† 5GB 512Kb/s	\$64.95† 10GB 1.5Mb/s	\$64.95† 10GB 1.5Mb/s	✓	✓	\$119 6mths	✓
Southern Cross Telco ADSL	www.sctelco.com.au	\$29.95† 400MB 256Kb/s	\$39.95† 2GB 512Kb/s	\$79.95† 30GB 1.5Mb/s	\$79.95† 30GB 1.5Mb/s	✓	✓	\$99 6mths	✓
Spin Internet	www.spin.net.au	\$19.95† 300MB 256Kb/s	\$29.95† 2GB+ 512Kb/s	\$59.95† No limit 512Kb/s	\$49.95† 15GB 1.5Mb/s	✓	✓	\$99 6mths	✓
TalkTODAY ADSL	www.talktoday.com.au	\$29.95† 500MB+ 256Kb/s	\$41.95† 5GB+ 512Kb/s	\$64.95† 10GB+ 512Kb/s	\$69.95† 30GB+ 1.5Mb/s	✓	✓	\$119 6mths	✓
Telaustralia Bus ADSL	www.telaustralia.com.au	N/A	\$39.95† 15GB 512Kb/s	\$79.95† 30GB 1.5Mb/s	\$79.95† 30GB 1.5Mb/s	✓	✓	\$120 6mths	✓
Telstra BigPond ADSL	www.bigpond.com	\$29.95* 200MB+ 256Kb/s	N/A	\$69.95† 12GB+ 1.5Mb/s	\$69.95† 12GB+ 1.5Mb/s	✓	\$2.50	\$99 12mths	✓
Fat Free Broadband ADSL	www.fatfreefones.com	N/A	\$49 25GB 512Kb/s	\$49 25GB 512Kb/s	\$89 35GB 1.5Mb/s	✓	✓	\$110 1mth	✓
TrumpNet ADSL	www.trump.net.au	\$29.95* 200MB 256Kb/s	N/A	\$75.95 No limit 512Kb/s	\$99.95 No limit 1.5Mb/s	✓	✓	\$135 12mths	✓
Web-Hermits ADSL	www.web-hermits.com	\$34.95 2GB 256Kb/s	\$41.95 2GB 512Kb/s	\$49.95 20GB 512Kb/s	\$81.95 20GB 1.5Mb/s	✓	✗	\$109 6mths	✓
Westnet Broadband1	www.westnet.com.au	\$29.95† 500MB 256Kb/s	\$34.95† 1GB 512Kb/s	\$69.95† 20GB+ 1.5Mb/s	\$59.95† 10GB+ 1.5Mb/s	✓	\$0.83	\$99 6mths	✓
Winshop ADSL	www.winshop.com.au	\$29.95 500MB 256Kb/s	\$39.95 3GB 512Kb/s	\$59.95 15GB 1.5Mb/s	\$59.95 15GB 1.5Mb/s	✓	✓	\$139 12mths	✓
Residential ADSL	www.yourhub.com.au	\$34.95* 300MB 256Kb/s	\$59.95 5GB 512Kb/s	\$79.95 15GB 1.5Mb/s	\$79.95 10GB 1.5Mb/s	✓	\$2	\$110 12mths	✗
ZCTS ADSL	www.zcts.net	N/A	\$49.50 25GB 512Kb/s	\$49.50 25GB 512Kb/s	\$88 35GB 1.5Mb/s	✓	✓	\$110 1mth	✓

Key: * ISP charges excess usage fees when you exceed your download limit; † This price only available if bundled with long distance telephony from the ISP; + Additional download allowance available with this plan for use in off peak periods; ^ ISP combines sent and received data when calculating usage. # Minimum BigPond Cable setup fee is based on 12-month contract with modem included. Telstra does not offer a BYO modem option.

Creating Vista



John Brandon speaks to the Windows Vista group product manager Chris Flores about Windows Vista product testing, user input and hard-to-find features.

Windows Vista has an overhauled foundation, new user interface and hundreds of unique features. ReadyBoost lets you add more memory, SuperFetch loads applications faster at start-up and SideShow lets you see email and other data without booting up the operating system at all. In this detailed overview of the user testing process, Chris Flores, group project manager for Windows Client at Microsoft, explains how Microsoft tapped the public for their input in a groundbreaking beta release program. We also ask if Vista will be the last operating system the company releases and discover what surprising features you might uncover only after six months of using the program.

APC: When you were designing Vista, what lessons did you learn and how did they shape future OS development? How much do you compare what's out there to what you're currently designing?

Chris Flores: We definitely look at everything that's out there. Nothing is developed in a vacuum. Mostly we talk to our users. With Windows XP, we have one of the largest installed bases out there. We do extensive research before we ship out and build anything. We look at Windows XP, we look at how the whole industry

and markets have shifted since then. Windows XP was released many years ago and many things in the industry have changed since then. Broadband today is in 50% of American homes, wireless networks are common, and everyone is living the digital lifestyle. More people are taking digital photos, listening to digital music, watching TV when they want instead of when they're told to. We look at what we delivered in the past, we look at what people

are trying to do today, and what technologies are available to enable these things. So it's really the user who decides what goes into Vista and what doesn't. As an example, I use the Acer Ferrari 1000, capable of running Windows Vista Premium with Aero Glass, with all of the Live Preview thumbnails, yet it's still incredibly light. It has AMD technology with a dual-core chipset. There are now more form factors for Windows Vista than we've ever seen.



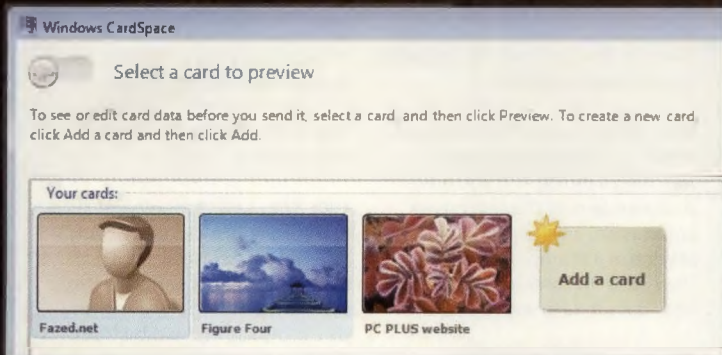
Vista SideShow

One screen not enough? Here's another. . .

Perhaps one of the most intriguing features of Windows Vista is SideShow, a low-power extension of several of Vista's Rally features, which provides the OS with a second display. Certain laptops have already embraced this secondary screen, building it directly into the unit, but the technology is not exclusively linked to PCs. Any device with a screen could end up a useful SideShow device; everything from Smartphones to futuristic fridges. And yes, we're serious about the fridge.

On a laptop, the feature lets you get a quick and dirty look at the data stored within. If you've got the relevant gadget installed, and if that gadget has a SideShow extension, the built-in module will allow you to, say, check your email without even completely switching the computer on. Although there's not much scope for input (the system currently only supports a very simple interface), this will be a revelation for email addicts. SideShow even has potential to be expanded into numerous other areas; imagine reading your favourite RSS feed, or monitoring distant downloads in a flash. External screens (either separate devices such as PDAs or motherboard-equipped SideShow displays) are a slightly different matter. They might not, as is the case with the built-in batch, give you much to look at while the computer is off, but they can act as a secondary display while it's running. If you use full-screen applications a lot, this will certainly cut out a lot of Alt+Tab use.

So, will SideShow change your life? Not yet: it's yet to find its killer app, and we're still undecided on building the screen into laptop displays. But you can be certain it will change the way you think about your technology, and it'll make you hungry for every device in your home to be interconnected.



Vista CardSpace

CardSpace is a system for protecting your credit card details when you shop online. Formerly a separate identity protection system called InfoCard, CardSpace is located in the Control Panel and allows you to manage your identity and use CardSpace-managed cards from credit card companies such as Visa or MasterCard. It's a feature that's not fully realised in Vista, however, at the time of going to press, major internet shopping sites such as PayPal had decided not to support it. It's also not clear whether users are ready to sign away their identity to a Microsoft system without knowing exactly how it works and with whom.

Creating Vista

Windows may soon crop up in many unusual places. It could even power a heads-up display (HUD) in your car. ➤

APC: How much usability testing did you do for Windows Vista?

CF: Enormous amounts. We simulated more than 60 years of performance testing on Vista, we had more beta testers for an operating system than ever before. RC1 [Release Candidate 1] had five million people beta testing. It's the most-tested product we've ever done. The CTP program gave us the opportunity to get the system into the hands of power users and casual users.

APC: Microsoft has become much more open with Community Testing Programs. I've been using Office 2007 for over a year and have never paid for it...

CF: Over the past four or five years we've seen a huge shift in how we deliver software. Our mantra these days is to deliver to customers early and often, and get as much feedback as we can. With all of our flagship software, the whole point is to get it out early, into the hands of beta testers, into the technically enthused to get their feedback. The earlier the better.

Again, the world has changed since Windows XP. We all have high-speed connections, it's very easy to download software, and users in general are much savvier these days.

APC: With all this testing going on, what created the main obstacles for delivering Vista on time?

CF: It all comes back to product quality. We want to ship a product that everyone is happy with, that's rock solid. It's standard practice for us at every significant milestone to gauge how the users are reacting, how stable the product is and whether it meets that high standard we want to deliver.

APC: Do you think you overestimated the quality? Because quality relates to depth, the more features you have, the more

opportunity for less quality. Do you think the original specifications for Windows Vista were too advanced?

CF: No, I think any product developer knows that with a product of this size, trying to schedule and release and determine a release date is part science and part art. So for each milestone you have to evaluate the feedback that's coming in against the quality gates that we've got in place to evaluate whether the quality can continue to the next milestone.

APC: Looking at the program, is there anything in Vista that's not as fully utilised now as Microsoft wants it to be?

CF: Some of the things people have never seen or experienced come to mind. Things like ReadyBoost, which is the ability to add RAM to your machine without having to take the machine apart and insert new chips. You can insert a compatible USB 2.0 memory stick and, as soon as you pop it in, Windows Vista will give you the option of using the RAM on that memory stick as additional system RAM. So that's one thing people will start becoming accustomed to. There's also SuperFetch, the new memory management system, which can examine your work patterns and behaviours and when you do certain activities, and it can pre-load memory. If you're the type of person who starts up Outlook, starts up your browser in the morning, Vista over time will recognise those patterns and pre-fetch those things. So it's always responsive and ready to work for you the way you want it to work.

APC: How do you play catch-up with new technologies, such as Location Based Services (LBS) in phones, where you can hold a smartphone up to a movie poster and the phone will play a trailer?

CF: We've developed Windows



Vista in a compartmentalised fashion, which means as new technologies come along, it's easy for us to add those capabilities. And because we've electronic software upgrades, even Windows XP continues to get better with Windows Update, and that will continue long after general availability. If we decide to add new capabilities to Windows Vista, we can do that down the road.

APC: What about Microsoft in the future? Will this be the last operating system or will there be a Vista 2.0?

CF: It's way too early to speculate. We've just released a brand-new operating system that we've been working on for years. We need to give it time for people to start using it, see which features they gravitate towards, the things people want additionally. Only time will tell on that one. Ask me the same question in six months or a year.

APC: There's a great new feature in Windows Vista when you're watching a movie — if you hover your mouse over the minimised application, it will show the movie playing in a thumbnail preview. How does that technology work? How does it tie in with the API?

CF: The underpinnings in Windows Vista are all based on new graphics technology and, in particular, DirectX 10. DirectX 10 is doing almost all the heavy lifting you're seeing, including the Live Preview thumbnails you just mentioned, all of the translucent effects you see with Aero Glass and the ability to see through window borders to what's behind them.

APC: Is the technology in DirectX 10 better than the graphics power in the Xbox 360?

CF: Vista is an extraordinary complement to the Xbox 360. The marriage of the two devices gives you the ability to stream all of your audio, videos and recorded TV. People are excited to have this in their living room. The computer is generally in some other part of the house. The connectivity you get between the two is great.

APC: What's the difference between the underlying technology?

CF: It comes down to choice. My son is an avid gamer, and he wants to have the Xbox 360 connected to the television. My parents have no interest in gaming, so benefit more from having the full-blown PC. If I get my father hooked on gaming, it will be a great marriage in the house because the two can discover each other, and provide you with the connected home, something that people have been chasing.

APC: With new technologies such as the driverless car, there could be a heads-up display (HUD) that appears on the windshield, and the operating system giving you information could be from Microsoft. What kind of features do you think Microsoft would provide to help a system like that function?

CF: Everyone is still chasing speech [recognition]. It's all about making the operating system smarter, giving the user more power and control. We've some of these advanced features in Windows Vista today. Casual end users can easily diagnose problems existing



The connectivity between Windows Vista and the Xbox 360 is the first step on the road towards a digital home, says Vista product manager Chris Flores.

on their machine, and there are many self-healing capabilities in Windows Vista. A common one is firing up your browser and it doesn't connect. What's the problem? Is the wireless switch turned off on my router, is it a connection between the router and the wall? We can give you a visual map that tells you the internet connection is down, or the laptop switch for wireless is turned off. Before, users had to call tech support or that smart person down the road.

APC: Are there some features which aren't so obvious that people will discover?

CF: The Xbox 360 and Windows Vista marriage is one example. I found that by accident myself. Windows Vista gave me a pop-up that said I had an Xbox 360. I got home and turned on my Windows Vista machine; my son was playing Xbox 360 and Windows Vista said, "I notice you have an Xbox 360, would you like to connect to it?"



MY SON WAS PLAYING XBOX AND VISTA SAID, I NOTICE YOU HAVE AN XBOX 360, WOULD YOU LIKE TO CONNECT TO IT?

APC:

Any other more unique, hard-to-find features?

CF: One of the things you might not find out right away is how many devices are supported. If you plug in a device, Windows Vista will recognise it the moment you attach it to a PC. Also, instant search will really change how people use their PCs; how people organise information. We also have more digital stuff to manage. I have 10-15,000 photos to manage and 10-15,000 songs: the ability to instantly find any of that media is incredible. If you forget where you put things, you just have to remember any little thing about the file — a word in the file, the name of the person who wrote it, the band that recorded the music

— and instantly search.

APC: Windows Vista seems to manage wireless connections better than Windows XP. What was the logic behind making the Network and Sharing Center more robust than just the Windows XP Service Pack 2?

CF: There are a lot of different places you can connect to an access point (home, work and public locations). Depending on where you're connecting from, you actually want your security settings to be different. From home, I want all the computers around me to share and exchange files. I know

and trust these computers because they're in my home. If I'm in a hotel or coffee shop, I want my security to be locked down; I don't want any other computers to access my PC. Whenever you connect in Windows Vista it says, "Tell me where you are", and depending how you answer that question, it will set you up with the appropriate security settings.

Clearly, Windows Vista was a monumental undertaking for the company. What's not yet as clear is how users are responding to the new features, the new look and the multiple versions available. As Chris stated, time will tell whether it finds a vast user base. APC



Living in a Linux-only universe, part 10

Join us for the final instalment of Open Source Challenge — to see just how easy or hard it is to use Linux as your main operating system. This month: the verdict.

ASHTON MILLS

Ashton has been a tech journo for over 12 years, including five years with APC.



THE RATINGS

In this project we're making the assumption that Windows does all that we need — and we're seeing if Linux and open source software measures up. Perhaps that's not an entirely fair place to sit; however, as the de facto in operating systems for which everyone is familiar, it's our best basis for comparison. So here's how we'll rate the experience of going Windows-free:

OPTIMAL

Passes with flying colours. The task could not only be completed, but better or easier than under Windows.



PASS

No problems. The task can be completed exactly as under Windows.



IFFY

When a task could only be partially completed or completed but not without issue.



FLOP

Not possible to complete at all. (Probably not a good thing.)



At the time of writing, the new Ubuntu 7.10 has just been released, making it perfect timing to wrap up our ten-part series on living in a Linux-only universe. Ten issues ago we embarked on this journey to see just how well Linux, and specifically Ubuntu, would handle being our sole operating system and if it would handle everything we needed to do from work to play, day to day.

After all, Linux has been developing rapidly and while, in recent years, it's made huge inroads into being a comprehensive desktop operating system, there's always been something missing. But armed with the latest 6.06 release of Ubuntu at the time — the darling of the Linux world, and a self-proclaimed distribution for the masses — we asked the question: can you really replace Windows with Linux and get *everything* done that you need to just as under Windows? Let's find out.

FIRST UP, A CORRECTION

You know the APC readership loves what you write when they email you to tell you how *wrong* you are. And they were *right*.

In Part 8 I mentioned how I had a hard time freeing up my disk space because I didn't have a Trash icon on my desktop — it's normally located in the bottom task bar but, unfairly to Ubuntu, in months of usage and playing I had removed it. My mistake: the Trash icon is easily accessed.

However, as I replied to my baying fans, the key point of my complaint still stands — while Ubuntu was happy to report my disk space had run out, it neglected the fact I had hundreds of megs in the Trash waiting to be deleted. And, instead, just bombed out. As I stated then, even Windows will prompt in advance as disk space runs out to run a disk clean up and, in the process, empty the Trash.

It's the simple touches like this that make the biggest impact and, in this case, would have saved me

manually emptying the Trash and starting the copy process all over again. And, without stating the obvious too much — the whole purpose of an operating system is to enable you, not hinder you. To be more productive, not slow you down. Even when it comes to the small things like running out of disk space.

TALLYING THE SCORES

Over the series, as I looked at various tasks — everything from office applications and online banking through to media playback and games — I gave them various ratings between Flop to Fantastic.

There were a lot of pleasant surprises with Ubuntu, but also quite a few frustrations too. Some results were clear cut, others were harder to call. Overall, though, despite being a Linux fanboy ever since Slackware came on floppies, I like to think I judged fairly in these results. And going by the feedback emails I received, a lot of you seemed to agree.

So, for the lower than expected results, where did it fall down?

If you've just tuned in now, you might wonder how I could score web browsing down with the power of a browser like Firefox, or

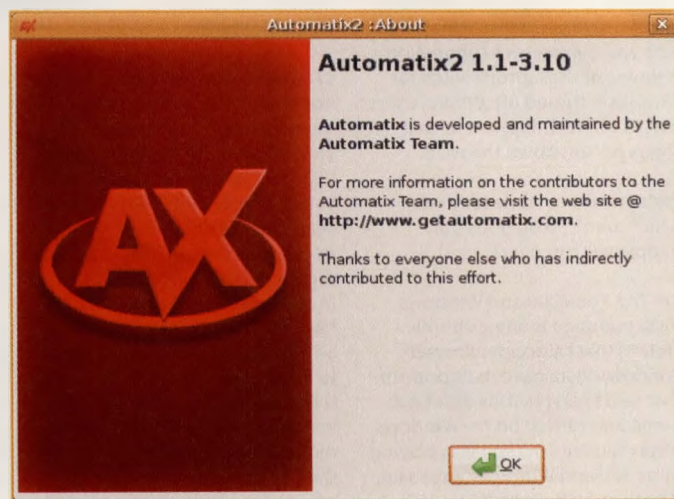
media playback given Linux's extensive codec support.

Well, stick a DVD into Ubuntu to see why for that, or try to encode a CD to MP3. Yes, I covered how Ubuntu's hands are largely tied by US law for these, that's fine, but the complete lack of explanation, even a redirect to learn more or for the onus on the user to install support was missing. A new Windows user to Ubuntu would simply think Linux was incapable. Fixed, of course, by going to the forums and reading up on solutions, but more on that in a moment.

And for browsing, sure, Firefox is fantastic, except for lacking necessary plug-ins like Flash and Java and no easy way to install them from Ubuntu itself — again without going to the forums.

Then there were hardware support issues — mainly with the webcam and the printer — which aren't Ubuntu's fault, but just the open source community at large (or rather, the hardware vendors). Regardless of the cause, problems were encountered that don't exist under Windows.

Finally, many issues were simply a lack of polish — like the Gnome application to copy images from a camera with the wrong



Automatrix brings Ubuntu up to speed in one neat package.



permissions, so it couldn't copy at all. Easily fixed from the command line for a Linux user, but a Windows user trying to live in a Linux-only universe would be left hanging.

Now, back to the comment on forums — if you've been reading the series, you'll know that going to the forums is not a solution. No, really, it's not — it's a crux. A simplistic but effective analogy of the areas where Ubuntu needs to improve would be this: if the user has to search forums to fix problems or find necessary files, then these are the problems Ubuntu needs to address. Unless you're playing with a cutting-edge beta release, a user should never have to search forums *just to get the desktop working*. This isn't being harsh; this is common sense.

If Ubuntu wants to be a desktop operating system that can replace Windows — and we all want it to be — it has to offer at least the same level of ease of use that Windows does. Or, more succinctly, it has to 'just work'. Making the user work to get their desktop functioning with basic features like media playback or getting a full

browsing experience on the web is counter-intuitive to why they installed it in the first place — it's supposed to work for you, not the other way around.

Now some of these issues have been fixed since going between 6.06 (the version my journey started with) to 6.10, and now 7.04. However, many still remain.

And what about the areas where Ubuntu excelled? All the important ones — all the key applications were there and worked wonderfully for me to use it as a working desktop, ie. to actually do my business with. The bundled apps including Firefox, office apps, printing and the necessary media players for me to watch my anime means I had everything at my fingertips, once they were properly set up. All the issues aside, and after the myriad issues I discovered were fixed, the desktop served me well.

I really should add one more category: stability. By far, Ubuntu makes Windows look like a castle built on a sandbank. Score one, Ubuntu. Fairly, however, I should also mention that I think a good part of Ubuntu's success (and for

the score I give below) as an easy-to-use desktop is down to Automatrix. It fixed many of the problems I encountered, and I know the same is true for a majority of Ubuntu users. Ubuntu should either take a leaf from its book, or include it (if it can work out the licensing issues of the libraries it allows you to install, such as for DVD playback). So, given the above, what's my verdict for living in a Linux-only universe? Drumroll...



LIVING IN A LINUX-ONLY UNIVERSE

And that, as they say, is that. I'm sure you have your thoughts to give, so drop me a line and let me know. **BTG**

NEXT MONTH

- My Ubuntu boot has migrated from its initial 6.06 installation through to a 6.10 upgrade and now a brand-sparkly-new Ubuntu 7.04. So, next month we start a new series, aimed at making the most of your Ubuntu 7.04 desktop. See you then!

HOW THEY RATED

To refresh your memory, here's the complete list of tasks and their ratings:



- Getting updates
- Uploading to sites
- CD and DVD burning
- Talking to the iPod
- Taking the upgrade plunge
- Evolutionary email
- OpenOffice
- USB drives
- Image management
- Image editing
- Video production
- Free games



- First impressions
- Network shares
- Printing
- Web browsing



- File management
- Native games



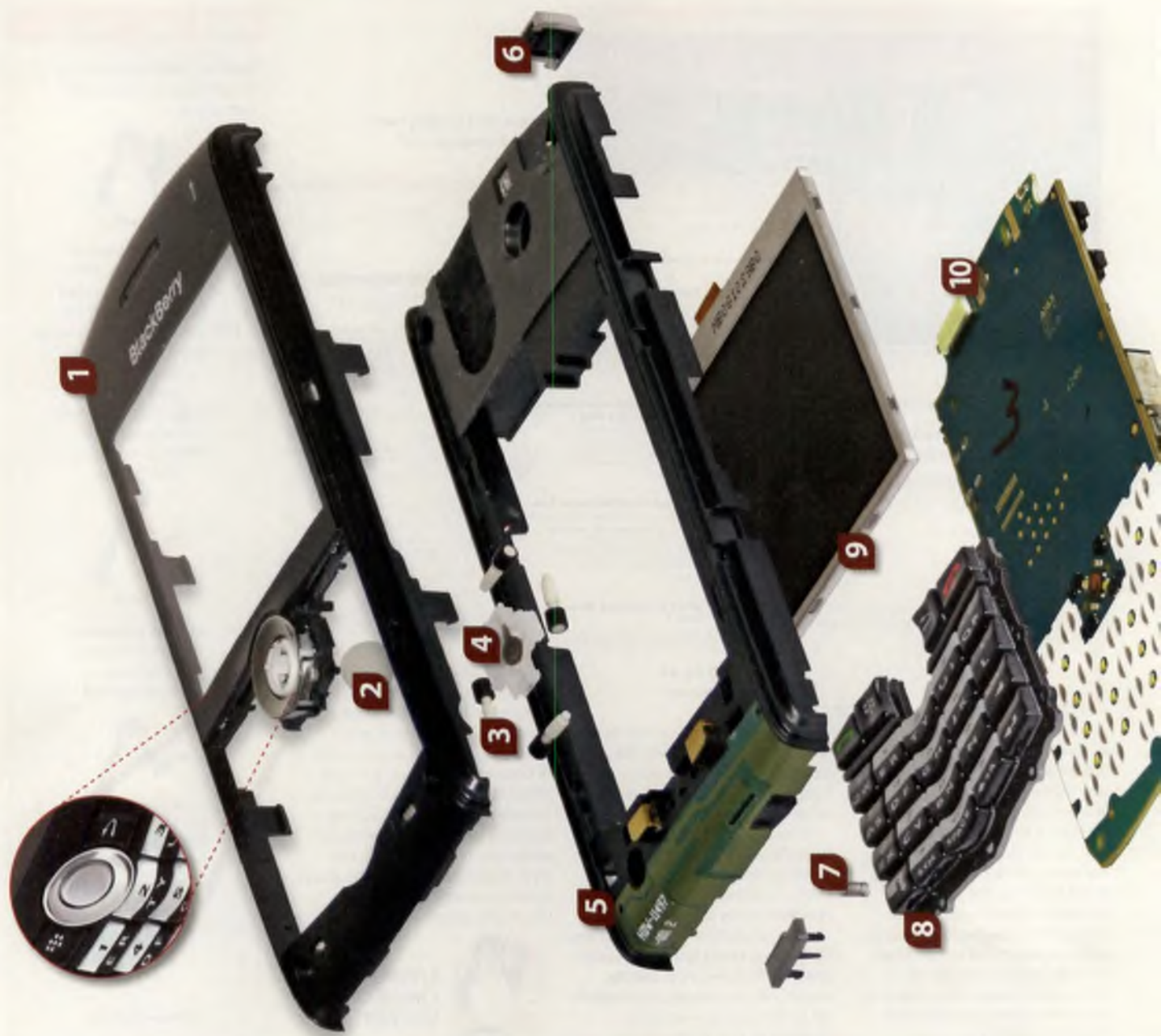
- Trans-gaming



- MP3 encoding
- Web StarCam



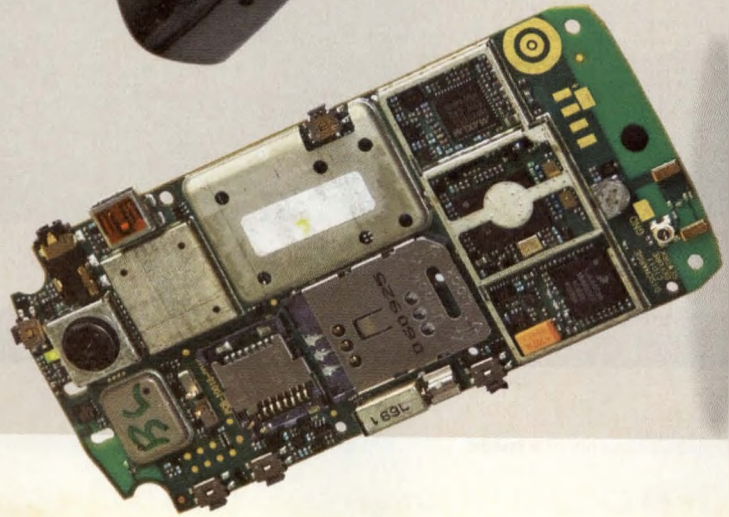
- Media playback
- Plug-in cameras
- Managing disk space



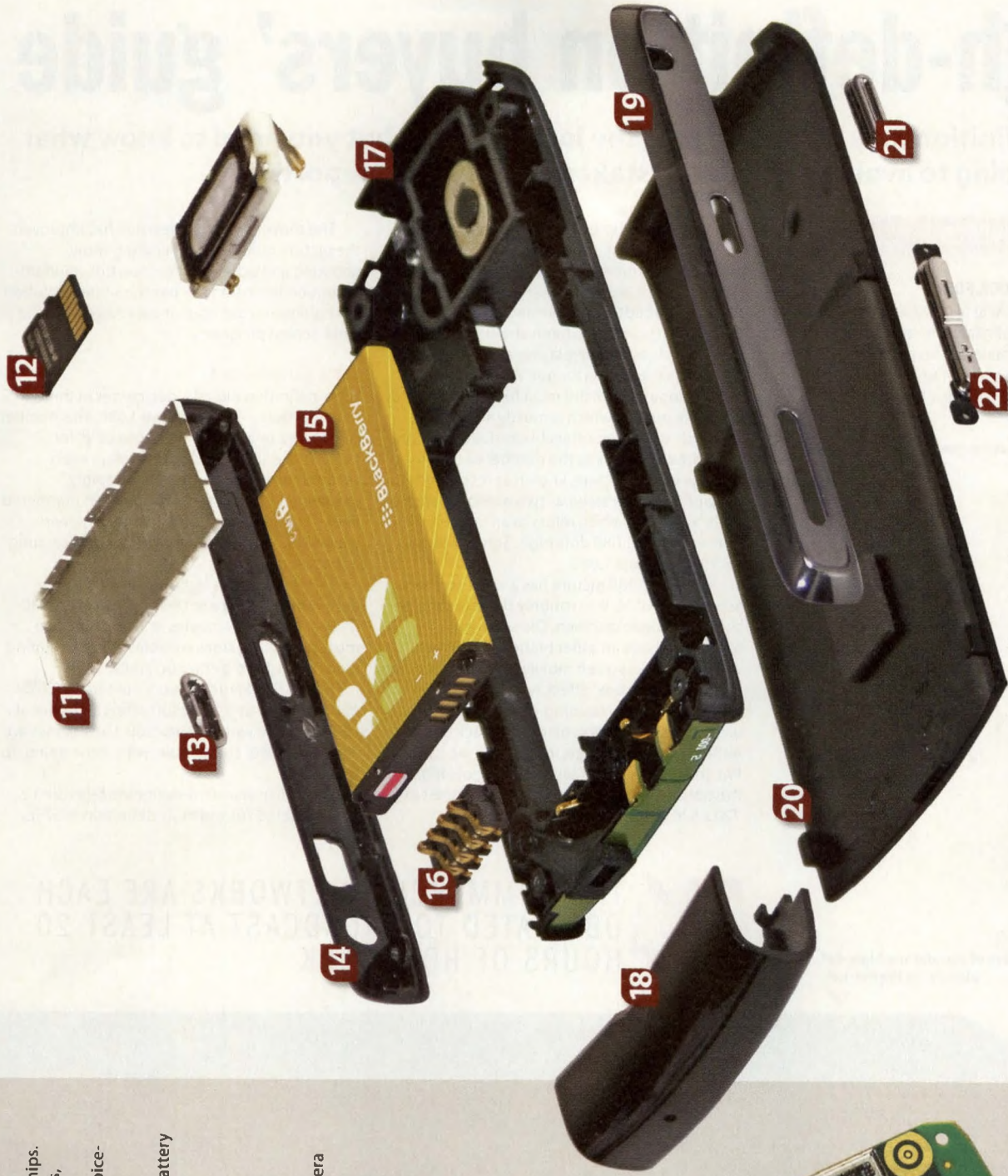
This month we're exploding the BlackBerry Pearl, with its famous push-email, 1.3MP camera, quad-band screen and trackball.

- 1 Front fascia.
- 2 BlackBerry Pearl trackball.
- 3 Rollers — move according to direction of trackball.
- 4 Trackball casing.
- 5 Inner casing.
- 6 Mute button.
- 7 Spring.
- 8 Keypad — QWERTY keypad uses SureType to learn as you type.
- 9 Screen — 65,000-colour screen with light-sensing technology to auto-adjust screen and keypad brightness.

- 10 Main circuit board.
- 11 Metal casing — protects onboard chips.
- 12 microSD card — storage for pictures, audio and video.
- 13 Left convenience key — activates voice-dialing application.
- 14 Side-casing panel.
- 15 Removable/rechargeable Lithium battery — rated for 3.5 hours talk time.
- 16 Electrical connector.
- 17 Back phone chassis.
- 18 Outer-shell casing.
- 19 Side-casing panel.
- 20 Back outer-shell/battery cover.
- 21 Right convenience key — open camera to take picture.
- 22 Volume buttons — adjust volume during call.



The BlackBerry's inside circuits laid bare, including the 1.3-megapixel camera lens. The entire unit weighs approximately 88 grams and measures only half an inch in height.





High-definition buyers' guide

High-definition may soon take over the lounge room, but you need to know what you're doing to avoid expensive mistakes. *Adam Turner reports.*

WHAT'S COVERED

WHAT TO LOOK FOR

If you're thinking of upgrading your standard-definition television with a high-definition set, here is what you need to consider when choosing between an LCD or a Plasma set.

It's a scary time to be upgrading your lounge room, as confusion reigns over a range of new formats and technologies. LCD or plasma? HD or True HD? Blu-ray or HD DVD? After early adopters got burned in the VHS vs. Beta format war, we've been afraid to pledge our allegiance too soon — playing a waiting game that drags the war on longer. When you're talking about video, the most fundamental issue is picture quality, which is mostly about dots — and high-definition offers bucketloads of them.

Definition refers to the number of dots used to make up the picture, known as resolution. Resolution is expressed as two numbers, such as 1,920 x 1,080 — which refers to an image 1,920 dots wide and 1,080 dots high. Sometimes this is shortened to just 1,080.

A 1,920 x 1,080 picture has a wide-screen aspect ratio of 16:9 — roughly the rectangular shape of a cinema screen. Old squarish televisions have an aspect ratio of 4:3. When watching wide-screen movies on a 4:3 television you get a 'letterbox' effect with black bars at the top and bottom. Watching 4:3 programs on a wide-screen television gives you black bars either side of the image. In Australia we use the PAL television format, which is 576 dots high, so Australian analogue television is broadcast in 720 x 576 (roughly 4:3).

The move to digital television has improved the picture quality by eliminating snow, ghosting and other interference, but standard-definition television still has the same resolution as analogue — although it uses 1,024 x 576 for wide-screen programs.

LET'S GO HIGH-DEF

High-definition digital video comes in three main flavours — 576, 720 and 1,080. This number is followed by an 'i' for interlaced or 'p' for progressive. Interlaced only displays every second horizontal line at a time, rapidly switching between the odd and even numbered lines to build up the entire image. Whereas progressive displays every line at once, creating a sharper picture.

The two formats fighting to be the high-definition successor to DVD — Blu-ray and HD DVD — both offer movies in 1080p. The two most powerful games consoles are also fighting it out in the high-definition arena.

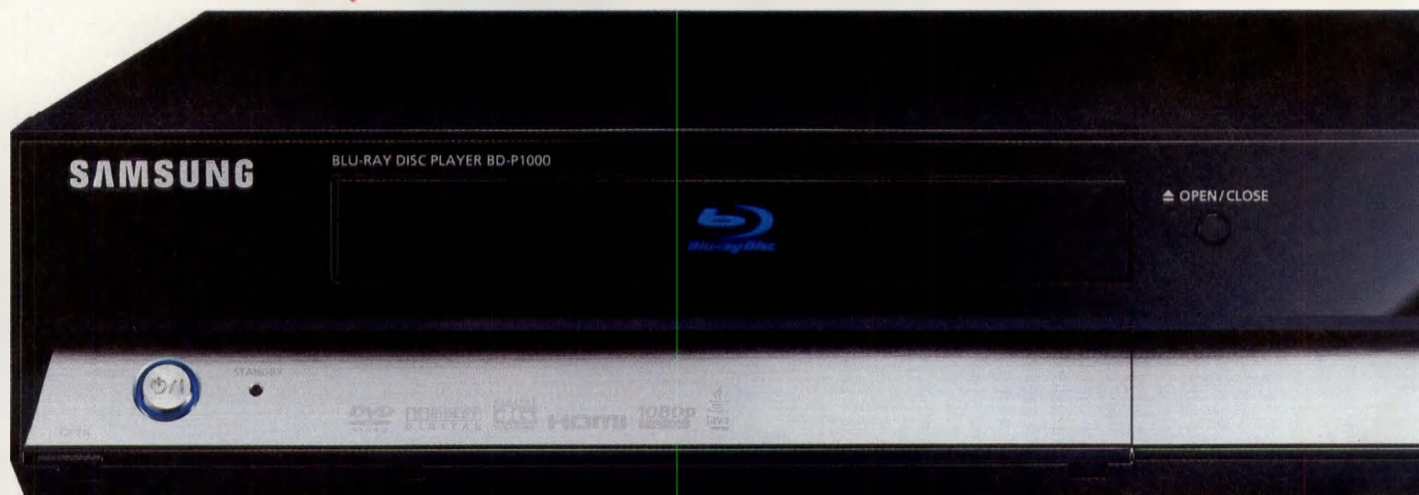
Sony's PlayStation 3 has a built-in CD/DVD/Blu-ray player and Microsoft offers an optional HD DVD drive with its Xbox 360. Most games are 720p and 1080i compatible, with some going up to 1080p.

Australian standard-definition television is broadcast in 576i and high-definition in 576p,

One of a wave of standalone high-def players on the market.



THE COMMERCIAL NETWORKS ARE EACH OBLIGATED TO BROADCAST AT LEAST 20 HOURS OF HD A WEEK



Pioneer's \$11,000 PDP5000EX —
as good as HDTV gets. ▶

720p or 1080i — even though 576 is only DVD-quality and isn't considered HD in most countries. The video is accompanied by an MPEG, Dolby Digital 2.0 (stereo) or Dolby Digital 5.1 (surround) soundtrack.

Of the major networks, only Nine and Ten broadcast in 1080i. Ten broadcasts much of its high-definition in 1,920 x 1080i, including Saturday Night AFL, while Nine only uses 1,440 x 1080i but says it is upgrading to 1,920 x 1080i "soon". The ABC recently moved to 720p, while Seven and SBS broadcast so-called high-definition in 576p, but Seven has started 1080i trials. (See 'Australia's HD television broadcasts'.)

Along with simulcasting programs in analogue and SD, the commercial networks are each obligated to broadcast at least 20 hours of HD a week.

All three commercial networks produce some local content in HD, it's mostly shows shot in the studio such as Sunrise, Mornings with Kerri-Anne, 9am with David & Kim and The Catch-Up. The rest is mainly US dramas, with the exception of McLeod's Daughters and Home and Away. (See 'Popular shows broadcast in HD'.)



AUSTRALIA'S HD TELEVISION BROADCASTS

CHANNEL	HD VIDEO FORMAT	HD AUDIO FORMAT
ABC	1,280 x 720p	DD 2.0 or DD 5.1
SBS	1,024 x 576p	MPEG
Seven	1,024 x 576p (trialling 1080i)	MPEG or DD 2.0
Nine	1,440 x 1080i (1,920 x 1080i in Perth)	DD 2.0 or DD 5.1
Ten	1,920 x 1080i (some 1,440 x 1080i)	DD 2.0 or DD 5.1
WIN	1,440 x 1080i	DD 2.0 or DD 5.1
Prime	1,024 x 576p	MPEG or DD 2.0
NBN	1,440 x 1080i	DD 2.0 or DD 5.1
Southern Cross Ten	1,440 x 1080i	DD 2.0
Tas Digital	1,920 x 1080i (some 1,440 x 1080i)	DD 2.0

ADVERTISEMENT

Samsung SyncMaster 206BW

Samsung Electronics Australia has released two new widescreen monitors with Windows Vista Premium Certification. Intended for widescreen market, the 20-inch model (SyncMaster 206BW) and a 22-inch model (SyncMaster 226BW) will be available from March 1st 2007, and will have a **RRP's of \$599 and \$899.**





This year, sport is going to drive the take-up of high-definition, with both the Rugby World Cup and the AFL (including the entire finals series) to be broadcast in 1080i.

Giant televisions help HD content look its best, but they also magnify any imperfections in the picture — and nowhere is this more obvious than watching fast-moving sport such as AFL. The footy in standard definition can look like a low-grade DivX on big LCD televisions, especially due to LCD's tendency to blur. Switching to HD helps compensate for the larger screen size, so the picture looks as sharp as standard-definition on a smaller television.

SOMETHING WORTH WATCHING

While those of us who aren't blessed with a high-definition lounge room might be missing out on all those extra dots, we're still not missing out on any shows because the high-definition channels are only simulcasts of the standard-definition channels. That could change this year.

When digital television was introduced, the government banned the commercial networks from creating a second digital-only channel with different programming, known as 'multi-channeling'.

Due to these restrictions, there's been very little reason for Australians to embrace digital television at all, let alone high-definition. Digital Broadcasting Australia says digital tuners — either in set-top boxes or built into TVs — can now be found in around two million Australian homes. Considering there are around 7.8 million homes in the country, that means only just over a quarter of lounge rooms have gone digital.

As of this year, the commercial stations are finally permitted to multi-channel, but only one extra channel and only in high-definition.



GIANT TELEVISIONS HELP HD CONTENT LOOK ITS BEST, BUT THEY ALSO MAGNIFY ANY IMPERFECTIONS IN THE PICTURE

If a network does launch a second channel in high-definition, you'll need a high-definition set-top box or television with a built-in high-definition tuner to watch it. You'll probably be able to get away without a HD television because many HD set-top boxes can convert HD channels to SD for watching on a standard TV.

When you look at it this way, it's easy to become disillusioned with high-definition but, between television, movies, games consoles and camcorders, high-definition offers something for everyone. So how do you get the high-def fairy to pay a visit to your lounge room?

LET'S GO HIGH-DEF

The high-definition lounge room requires three things — HD content, a HD player/tuner and a HD display. If you're in the market for a new high-definition television, there are a few things to keep in mind.

Even though much of Australia's high-definition television is broadcast in 1080i, until recently most so-called high-definition televisions only had a resolution of 720p and downgraded a 1080i signal to squeeze it into 720 lines. When native 1080p televisions finally arrived, set makers came up with terms such as 'Full HD' or 'True HD'. Beware of anything that doesn't have HD written on it at all: it's probably 852 x 480 — not even enough dots to do a DVD justice.

Buyers still need to beware even when buying a 1080p television. Some true HD televisions only come with SD tuners built in, meaning you still need a HD set-top box to watch high-definition. If you're looking at a HD set-top box, consider one with a built-in hard

drive for recording shows, known as a personal video recorder.

After digital television, the next obvious source of HD viewing pleasure is Blu-ray and HD DVD. Neither player comes cheap — Samsung's Blu-ray BD-P1000 retails for \$1,599 and Toshiba's HD-E1 for \$1,099 — although you'll knock a few hundred dollars off by shopping around. At the moment, a cheaper option is to buy a PlayStation 3 with its built-in Blu-ray or an Xbox 360 with the HD DVD add-on.

As for movies, both formats sell for around \$40 to \$45, but there are far more Blu-ray titles available in Australia than HD DVD. A quick check on Sanity.com.au reveals 26 HD DVD titles compared to 93 Blu-ray. Blu-ray and HD DVD shelves are also starting to pop up in video rental stores.

Online movie rental service Quickflix says even though it has twice as many Blu-ray discs

POPULAR SHOWS BROADCAST IN HD

CHANNEL	SHOWS
ABC	The West Wing
Seven	Home and Away, Lost, Desperate Housewives, Brothers and Sisters, 24, Heroes, Prison Break, My Name is Earl.
Nine	CSI, The Closer, Two and a Half Men, McLeod's Daughters, Cold Case, Without a Trace
Ten	Supernatural, NCIS, Numbers, House, Medium, Law & Order, Saturday Night AFL

Sony's PS3 has a Blu-ray player included.



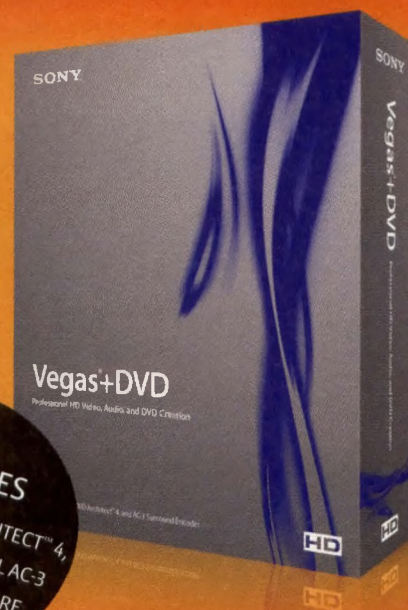
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▲ This split Spiderman shot shows the difference in resolution between a full high-definition of 1080p and standard PAL broadcasts.

1080p

576p

available as HD DVD, 1,900 customers have rented or requested HD DVD as compared to 1,030 for Blu-ray.

How much of an improvement these new formats are over DVD depends on how you've been watching your DVDs. If you connect a Samsung BD-P1000 Blu-ray player to a hefty 46in 1080p LCD using a HDMI cable, Blu-ray is certainly an improvement on DVD, but those expecting a religious experience will be disappointed. This is because the BD-P1000 already upscales the 576p DVD to 1080p, taking an educated guess at where the extra dots should be. Switching from a HDMI cable to three

component video cables — using the red, green and blue video connectors found on the back of most DVD players — downgrades to 1080i upscaling with a clear drop in image quality (more due to the use of component cables than the resolution).

Switching to an ordinary DVD player using component cables means you lose the upscaling and are stuck with DVD's native 576p, which looks very shabby on a screen that big. On a 46in screen, the difference between DVD from your old DVD player via component and Blu-ray from the BD-P1000 via HDMI is more impressive than the jump from VHS to DVD.

If you've got an old television with only a composite video input (the yellow plug), you could be in for a shock. Some players, such as Samsung's BD-P1000, refuse to downscale Blu-ray discs to 576i via composite video so you get nothing. Read the spec sheet carefully, because there's no point in buying such a player if you're not ready to shell out the cash for a HD television to go with it.

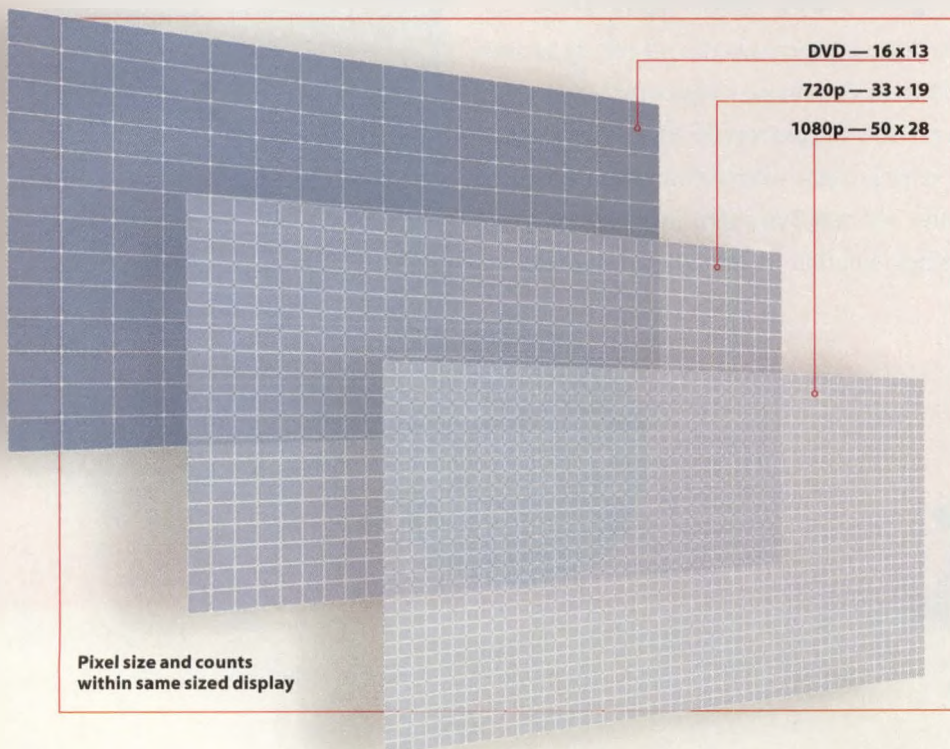
LCD OR PLASMA?

The general consensus is that the best plasmas look better than the best LCDs, although chat to a company like Sony, which only makes LCD HDTVs, and you come away convinced LCD is the way of the future.

LCD uses an electric field to manipulate tiny crystals, with a back light shining through them to create various colours. Plasma uses an electric charge to turn gases into a plasma which then excites phosphors to emit light. The lack of a back light in plasma displays allows them to produce darker blacks, offering better contrast and detail in the shadows. Even the expensive LCDs are plagued by motion-blur, which makes fast-moving objects streak slightly. The lower a display's response time, measured in milliseconds, the less blur. Look for 8ms or less.

Plasma is criticised for having a short lifespan, with early models losing half of their brightness after 20,000 hours of viewing, but the latest models are close to matching LCD's 60,000 hours. Plasmas are also prone to screen burn if you keep the same image on the screen for too long, but newer models employ screen savers — and most burned images tend to fade. This shouldn't be a problem unless you intend to play a lot of video games that have static elements.

LCD is criticised for having narrow viewing angles, when you stand off to the side the picture fades to black, but the latest generation of LCD TVs have generally overcome this.



Toshiba is one of the main supporters of the HD-DVD standard.



The first thing to decide is what size television you're after. It's not worth getting excited about true HD if your fancy new wide-screen television measures less than 37 inches diagonally, because you're unlikely to be able to see all those extra dots anyway.

LCD televisions range from 17in to around 50in, while plasmas generally start at 32in and go up to 65in (not counting those 100+in giant plasmas they like to trot out at technology shows).

You can pick up a 42in 1080p LCD for under \$4,000. A 42in plasma will probably cost a few hundred dollars more, but it will only be 720p or maybe 1080i. To get a 1080p plasma you need to look at 50in display like Pioneer's \$11,000 PDP5000EX. The picture is exquisite; it's one of the best televisions money can buy in Australia today. The PDP5000EX, however, isn't actually a television, just a big monitor. There's no TV tuner or speakers, but it does have left and right terminals for connecting external stereo speakers.

Of course, not everything you watch will be in high-definition. Giant televisions magnify any imperfections in standard-definition material, but the PDP5000EX features excellent onboard video processing which ensures that DVD, VCR and SD television still look their best. The fact both high- and standard-definition images look excellent on the PDP5000EX makes it the good choice for riding out the slow introduction of high-definition content.

Assuming your budget doesn't stretch to 1080p plasma, you're left to choose between a 1080p LCD and a 720p plasma. Remember, HD content generally comes with great sound, so think about putting some money aside for a surround sound amplifier and speakers.

Final picture quality is determined by the onboard video processing, so don't just play it by the numbers. A top-quality LCD with a high response time can still look better than a bargain basement set with a low response time. A top-shelf 720p plasma can also look better than an el cheapo 1080p LCD. Apart from reading plenty of reviews, the only way to know for sure is to get out there and compare them with your own eyes.

TRUST YOUR EYES

Beware of stores that use animated Pixar movies such as *Monsters, Inc.* to show off their

that have the brightness turned up to help them stand out from the crowd. Don't be bullied into making a quick decision with the 'I can give you this one cheap, but only if you buy it today' ploy.

Apart from size, resolution, built-in HD tuners and refresh rate, you should also look for at least one HDCP-compatible HDMI port — High-definition Multimedia Interface being the new digital format combining high-definition audio and video in the one cable. HDCP (High-bandwidth Digital Content Protection) is used to encrypt the video signal between the player and the television. It only works if you're using



IT'S NOT WORTH GETTING EXCITED ABOUT TRUE HD IF YOUR FANCY WIDE-SCREEN TV MEASURES LESS THAN 37 INCHES

televisions — they make any television look good because they don't feature the fine details, subtle lighting and colour gradients of real life. You want to see the television running free-to-air broadcasts, DVDs and Blu-ray or HD DVDs.

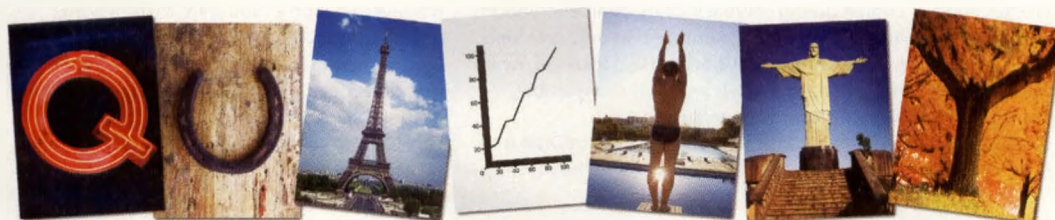
Don't be afraid to take along your favourite DVD to see how it looks. I like to use *Fellowship of the Ring*, where Gandalf fights with Saruman at Isengard, looking for fine detail in the shadows and whether the tuft of whiskers under their bottom lips is a grey blur or if you can see the individual hairs.

If the shop assistant thinks you're being too fussy (or is more interested in making a sale than answering your questions), consider taking your business elsewhere. Beware of sets

HDMI or DVI cables, and it requires both the player and the display to be HDCP-compatible. If your television isn't HDCP-compatible, or if you're using an analogue video cable such as component, the picture quality of high-definition content such as Blu-ray or HD DVD movies is downgraded to roughly DVD quality. Sometimes you won't get a picture at all.

Other things to consider include a long warranty and the policy on replacing LCDs with dead pixels. It's also worth having someone not just deliver the television but calibrate it to match all your components (a service only some stores offer).

Now all that's left to do is invite some friends around, cook up some popcorn and sit back to enjoy some high-definition goodness. **EPSON**



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WHY YOU CAN'T ESCAPE DIGITAL RIGHTS MANAGEMENT

The total guide

Along with high-definition video comes a renewed focus on copy protection. *Angus Kidman* helps guide you through the minefield that is digital rights management.

Go on, admit it. If you own a PC, you probably have at least one file on there that you shouldn't have, whether it's an MP3 of an unreleased song by your favourite band or digitised video from a TV show.

Copying stuff without permission is not a new development. Charles Dickens' novels were widely produced in 'pirate' editions in his lifetime. More recently, the widespread advent of office photocopiers, audio cassette players and VCRs made the practice of copying by individuals (rather than professional bootleggers) much more widespread.

The development of digital formats for text, music and images, and the near ubiquity of PCs in modern first-world countries, has added a new twist to the issue. Now, with a single device, it's possible to make copies of virtually anything, in a quality that's near-indistinguishable from the original (something that can't be said of a photocopied novel or a fourth-generation VHS tape).

Peer-to-peer file sharing networks and cheap digital storage also make it possible to easily and (largely) anonymously share those copies with others. If you're a business that relies on selling

original content — a publisher, a record label or a movie studio — it represents a major headache.

Content developers have responded in several ways to that challenge. Some, such as offering bonuses like exclusive web sites, DVD extras or preferred access to content (or tickets to purchasers of commercial CDs), are designed to make legitimate content more appealing. The promotion of high-definition formats (such as Blu-ray and HD DVD) is also an indirect anti-piracy measure, since it produces larger file sizes that are harder to share around.

However, the dominant response has been to try and make it harder to copy the files in the first place: a strategy originally labelled 'copy protection' and, more recently, as 'digital rights management' or DRM. Broadly speaking, this can be implemented in one of two ways: by restricting the ability for an existing format to be copied during playback, or by using encryption and user accounts to ensure that only specified individuals can play back certain material. While the latter approach is arguably more visible, both are in widespread use.

A major bone of contention about DRM is that it can make access to content a headache

for legitimate users. DVD copy protection, for instance, theoretically made it impossible to play commercial DVDs on Linux systems, though it didn't take long for that particular problem to be solved.

While hackers have devoted great energy to trying to work around DRM, the population at large is largely ignorant of its existence. A survey of 3,000 Australian consumers by Connection Research showed that only 20% claimed to have any understanding of the term "digital rights management". Around 60% had no understanding of DRM at all, and 20% had encountered the term but didn't know what it meant.

So what does all this mean in practice? If you only want to use a standard PC, and all you want to do is play your locally purchased CDs or DVDs, then you won't have too much to worry about. However, as soon as you want to display any degree of flexibility — such as playing digital files on multiple devices, purchasing content from outside Australia or looking at content in both standard and high-def formats — you're very likely to run into some Digital Rights Management woes.

to DRM



MUSIC FORMATS

In their standard form, CDs have virtually no copy protection. That wasn't much of a problem for the music industry when the only way to copy CDs was on the 'inferior' tape format, but once PCs made it possible to produce either cheap exact copies or relatively compact MP3 rips, executive stress levels rose rapidly.

Attempts to enforce copy protection on CDs have largely been a miserable failure, in large part because CDs are now so widespread that it's virtually impossible to produce a system that makes it impossible to rip audio files without also making it likely that the CD won't play at all. This is most commonly a problem if a PC is the preferred playback device, but has also been an issue in many car players.

Copy Control technology, which used a technology known as Cactus Data Shield to make it difficult for PC CD drives to rip the normal audio content on a CD, was used on a number of CDs released in Australia in the early 2000s. However, it has now been abandoned. Sony's more infamous Extended Copy Protection system, which installed rootkit software on PCs without notifying the user, was never officially used locally.

Conversely, online music stores such as Apple's iTunes and Telstra's BigPond Music have made use of copy protection since their inception. (While EMI has recently begun selling unprotected music in high-quality AAC formats

via Apple's iTunes store, other major labels are yet to follow suit at the time of writing.) Users who aren't running either Windows or Mac OS are generally excluded from directly using any of these protected formats.

Apple's FairPlay system is fairly representative of the approach taken by all digital audio protection systems. Content encrypted with FairPlay is associated with a specific user account and can be copied to any number of machines.

However, in order to be played, the machine in question must be authorised for that account. No more than five machines can be authorised simultaneously, which effectively limits the number of copies in circulation. The file can be copied to any number of iPods, but iTunes doesn't allow a single iPod to accept copies of different files from different machines — if it's connected to a 'new' machine, all existing content is wiped. In practice, that means you could quite easily swap playlists with friends, but you wouldn't be able to have the same copy-protected playlist on two iPods.

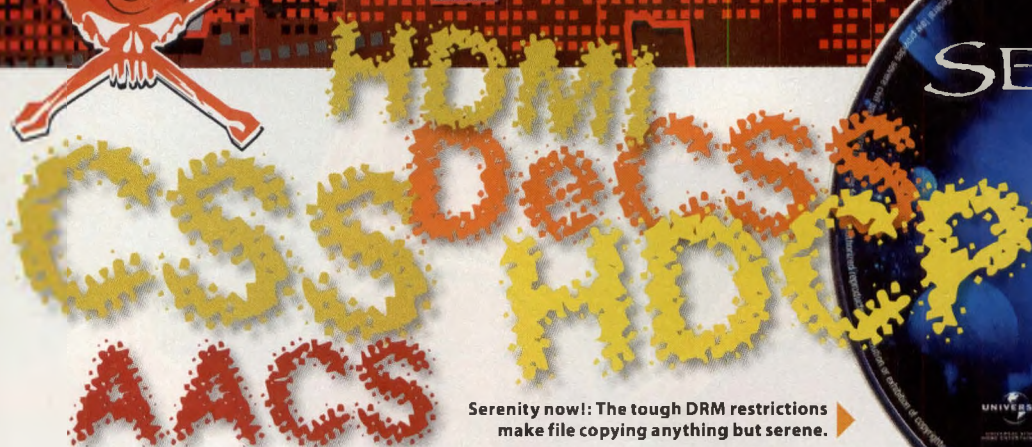
Windows Media DRM, the system developed by Microsoft (and often marketed under the PlaysForSure brand), uses a similar basic approach, though details of implementation differ depending on both the player and music store involved. Microsoft's own much-derided Zune player has its own separate copy protection scheme.

THE LEGAL POSITION

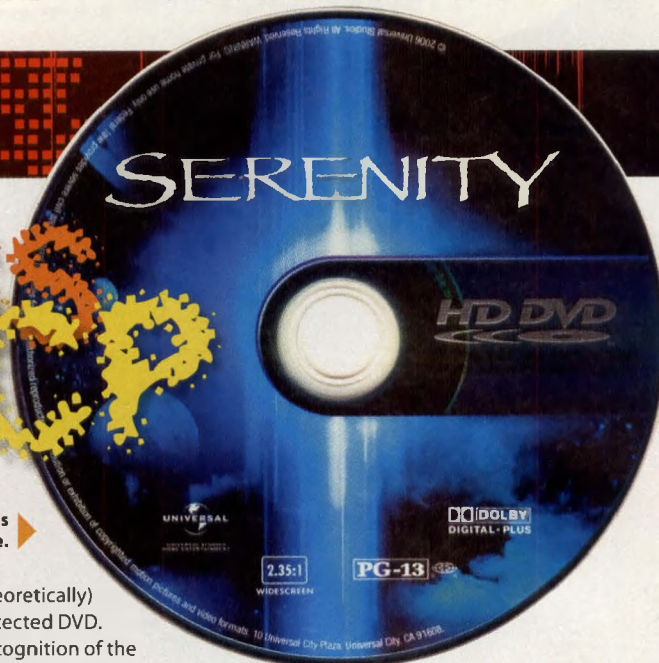
Until relatively recently, Australian copyright law made only limited allowance for the possibility of legal digital copies. It was possible to make backup copies of computer software (and even to reverse-engineer the code to ensure data access), but most other kinds of copying, including recording TV shows for later viewing and copying music from CDs onto a digital player, were technically illegal.

Under the Copyright Amendment Act 2006, those kinds of time shifting and format shifting became legal for individual consumers. However, the use of software specifically designed to circumvent copy protection remains illegal, though no individuals have been locally sued for doing so.





Serenity now! The tough DRM restrictions make file copying anything but serene. ▶



In practice, nearly all such systems can be easily subverted by burning the content onto an audio CD and then ripping it from the CD. (It's possible for music sellers to specify that copies can't be burnt to CD in some formats, but this approach is relatively rare.) It's also always possible to use the 'analogue hole' and make a new recording from the existing audio playback on the PC, though this can only be done in real time. As well, hackers have developed software that automatically strips the DRM component from existing files, though success rates with these vary.

MOVING PICTURES

DRM for video content pre-dates the digital era. Since the mid-1980s, most commercial video tapes have used a protection system known as Macrovision (named for the company that developed it), which inserts an extra signal into the video blanking interval, causing huge colour variance in any copies made of that video (using a standard VCR). Macrovision is also implemented on many (though not all) commercial DVDs. As Macrovision on DVDs is implemented as a command rather than directly encoded into the content, some DVD players can be set to ignore it.

The more fundamental form of copy protection used on DVDs is CSS (Content Scramble System), which uses a 40-bit

encryption system to make it (theoretically) impossible to directly copy a protected DVD. CSS was introduced in 1996 in recognition of the fact that DVD copying was likely to be a major problem for content developers. However, since the details of the scheme were kept secret and only made available to licensed software developers, it wasn't possible for users to build their own DVD playback software.

Frustration with that led to a group of hackers, including Norwegian Jon Johansen (now often referred to as 'DVD Jon'), to reverse-engineer the algorithm, creating a piece of software known as DeCSS. Other brute force attacks designed to beat the algorithm followed, and CSS is now generally regarded as fundamentally broken. While most commercial DVD-ripping software still won't allow DVD content to be ripped or copied, tools to enable that process are widely available.

HIGH-DEFINITION HEADACHES

Mindful of the DVD problem, successor formats to DVD have implemented much more stringent copy protection. While CSS

used the same approach, both Blu-ray and HD DVD have adopted a theoretically more robust scheme: Advanced Access Content System (AACS). AACS assigns a separate encryption key to each individual movie title, so even if a single title gets cracked open, the others will still remain safe.

At least, that was the theory. Last December, hackers launched a tool to allow decryption of HD DVD movies, and a similar Blu-ray version followed soon afterwards. While it still remains the case that individual keys need to be identified for each movie, that only needs to happen once — once the key is out there, anyone else can get a copy of it.

For now, movie executives can take some comfort in the fact that the size of high-definition DVD files (typically as much as 20GB) means that they're not particularly speedy to exchange online. Nonetheless, the speed with which the schemes have been broken doesn't necessarily suggest a glowing future for either rival HD format.

Copy protection in the high-definition universe doesn't end there. The High-bandwidth Digital Content Protection (HDCP) specification developed by Intel as part of the High-Definition Multimedia Interface (HDMI) standard also plays a key role.

The practical upshot of HDCP is that if you attempt to play back high-definition content on a system that doesn't use HDMI cables on every single connection, you won't get a high-definition image. This prevents direct signal piracy, but it's also likely to lead to a lot of confusion amongst consumers who don't realise why their shiny new HD player isn't working properly. (Incidentally, if you're thinking the preponderance of acronyms is one reason so many people don't understand DRM, we won't be racing to disagree.) **ETC**

BOOK'EM, DANNO

While less frequently discussed than music and video, ebooks also make extensive use of copy protection. The two dominant formats in the market, Microsoft's Reader and Adobe's Acrobat, both utilise a fairly fiddly process that requires users to associate each title they purchase with a given user account — and associate any device used to read that book with the same account as well. (This is similar to the approach taken for digital music, but the

authorisation process is more awkward.) While other entertainment formats have quickly become dominated by digital content, in book publishing, old-fashioned paper formats reign supreme. Whether this is because books are simply more convenient — or because the process of authorisation is so inconvenient — remains much-debated. (Another nuisance effect of such encryption schemes is that ebooks generally aren't indexed by desktop search tools.)





Set up your own network attached storage

Reanimate that old PC and save hundreds of dollars in the process by creating your own NAS. *Graham Morrison* shows you how.

WHAT'S COVERED

● CREATE PLANS

If you have a couple of machines at home, it can be a real hassle accessing your music collection from one machine or another. We'll show you how to build a cheap network attached storage device that sits at the centre of your network, serving files to any machine on your network.

REQUIREMENTS

● AN OLD PC

Our idea is that you can use those old components you've been keeping for an emergency.

● BORROWED KEYBOARD, MOUSE AND SCREEN

Just for configuration. After it's all set up, you can give them back.

● LOCAL NETWORK

The device needs to be accessible from your home network, either by connecting it to a switch or using a wireless expansion card.

● UBUNTU LINUX ON CD

We'll use Linux to drive the server. It needs to be burnt onto a blank disc, and the old PC needs a CD-ROM drive to boot the disc. The required version, Ubuntu 6.06 LTS was distributed on APC's cover disc in August 2006. Otherwise, download it from www.ubuntu.com/getubuntu/download.

The phrase 'network attached storage' is hardly designed to set imaginations alight. It sounds more like something you'd find in the clinically clean data centres of Google or IBM rather than a useful addition to your own network. But despite its name, network attached storage, or NAS as it's otherwise known, can considerably enhance your setup. It's basically a hard drive that can be accessed from anywhere on a LAN. As many of us now use a combination of laptops, desktops, media centres and music players, a single repository for files that need to be accessed from each device makes a great deal of sense. A photo collection is a good example. Keeping your collection on a NAS device at the centre of your network would mean that each device would have access to the same photo library. No more syncing between machines and wasted disk space on duplicate files.

NAS devices have long been the domain of corporate IT networks. But recently, various hardware manufacturers have realised there's considerable consumer demand for centrally located storage. The added technology makes these devices more costly, and the price will come as something of a shock now that we're used to paying rock-bottom prices for storage. There's more to the typical NAS device than a hard drive with an Ethernet port. You need to

know which protocols you're going to use, how you're going to secure your data, how to tune performance and grant permissive access.

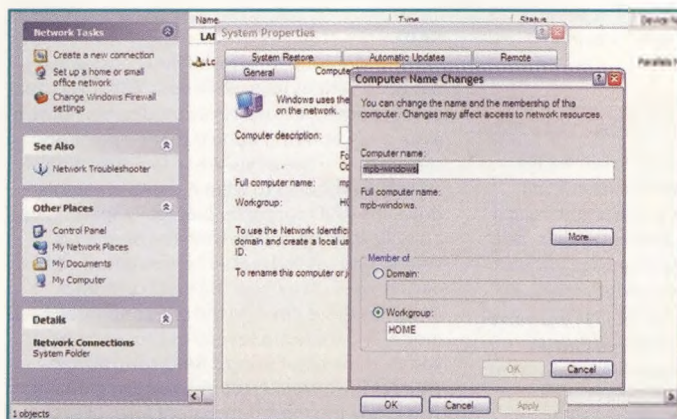
Fortunately, there's a far less costly solution and it's sitting right under your nose — that old machine you've had under your desk since you last upgraded your main machine. In fact, you could even get away with using the machine before that if you've still got it. Using a freely available operating system, such as GNU/Linux, means you can run a no-cost OS on top of your low-cost PC: a solution costing next to nothing.

HARDWARE CHOICES

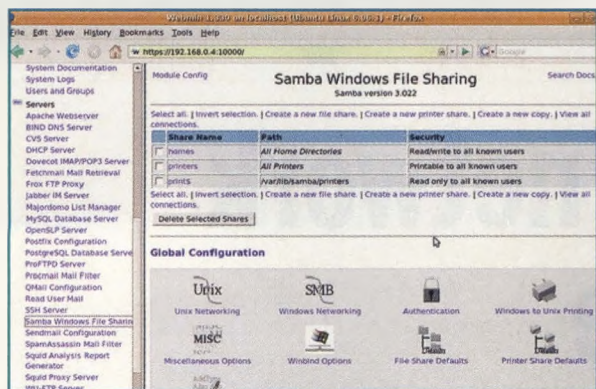
Hardware requirements for a device that's

HANDY TIP

Security is a consideration for your NAS. Sharing folders through Samba without password authentication could be a risk. Make sure your NAS is securely behind a firewall, with no ports accessible from the net, or make sure your wireless is secure, preferably with WPA encryption. Enabling password authentication in the Samba configuration file isn't considered secure enough for the web. Try tunnelling SSH instead.



In Windows, make sure the Workgroup name is the same as the Samba configured workgroup. Change this from the system properties panel.



Webmin is great for remotely managing every aspect of your NAS device through a web interface.

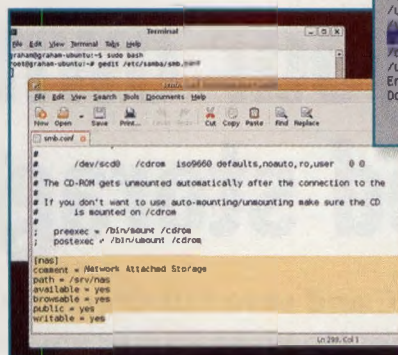
basically a simple server are modest. Any CPU from the last five years will do, and you won't need any more than 256MB RAM. As an absolute minimum, it's actually possible to build a working NAS with an old Pentium CPU, 16MB RAM and a version of FreeBSD running from a floppy disk — but configuration will be harder and performance far poorer, so we can't really recommend this route. You'll need some form of network connection, and a simple Ethernet/RJ45 port is probably the easiest option. Many motherboards will include one port already, and you'll just need to connect this to a switch for the NAS to be accessible from a wired network. Many of us have moved to a wireless network, and you can avoid the extra expense of adding a wireless PCI card or USB stick by connecting the NAS to one of the spare Ethernet ports you often find on the back of a wireless router. Finally, just for installation and configuration, you'll need a keyboard, mouse, graphics card and screen. After setup, Linux will run with these disconnected.

As you can easily guess, the main consideration for a device that's going to spend most of its time shuffling data from a disk to the network is disk access, and this requires a little thought. The hard drive is slightly different. While we can get away with an old system for handling the input and output, the same isn't true of storage. And these days, capacity is

HANDY TIP

If you need remote administration without the hard-core command line, the answer is a tool called 'Webmin'. Installation is straightforward if you follow the instructions on their web site, and the result is a web-based configuration tool that can handle anything from your RAID setup to the folders you're sharing with Samba. You just point your local browser to port 10000 on the NAS machine, log in with your administrator password and click on the icons to select the tool.

Choosing to store your NAS data on a separate partition or disk means that you can upgrade the operating system while leaving your data alone.



```
Mount point for this partition:
/ - the root file system
/boot - static files of the boot loader
/home - user home directories
/tmp - temporary files
/usr - static data
/var - variable data
/vm - data for services like virtual machines
root - add-on application software packages
/usr/local - local hierarchy
Enter manually
Do not mount it
```

Log in as the administrator to Gedit or the files will be read-only.

everything, so unless you happen to have a spare half-terabyte drive lurking under your bed, the only expenditure you're likely to incur building your own NAS device is buying the storage. Fortunately, data comes cheap these days, and you can easily pick up a 500GB drive for less than \$350 with the IDE interface that older hardware is likely to require. If you already have a SATA interface, then drives can be bought for around 25 per cent less — but there's very little real-world performance difference between the two (don't upgrade if you're stuck with IDE).

Network transfers are always going to be slower than disk read and write speeds, so you won't gain any advantage in having the fast disks. However, networks are getting faster, and under certain circumstances you might need to build a disk configuration for performance. Two prime examples of when performance is paramount are video editing and recording studios. Both typically use network attached storage for the raw data produced during an editing or recording session. This data is then immediately available for two other editing or recording suites, streamlining the whole creation process. Video and audio files can be massive, which is why both disk performance and data security are vital. And the technology that provides for both of these is RAID.

RAID

RAID — a redundant array of inexpensive disks, has been with us for a while now. With RAID, two or more drives are used in a combination known as an array, and they appear to the operating system as a single drive. When the operating system writes data to what it thinks is a single drive, the RAID controller is actually splitting up a single write operation from the operating system into several real write operations across each drive. Exactly how the RAID controller manages this is down to the pre-configured RAID mode, and there are several to choose from. If you're thinking of using a RAID controller in your NAS, we would recommend using RAID 1. This offers the most transparent form of security

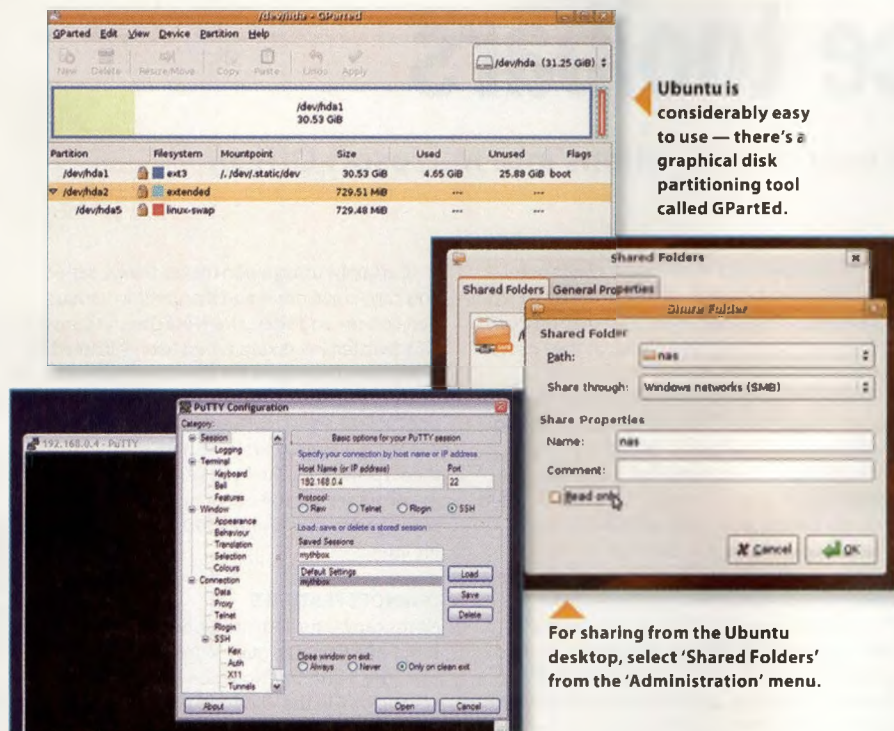
RESOURCES

As we've used the Ubuntu Linux distribution, the most important link is that for downloading the distribution itself. All versions can be downloaded from www.ubuntu.com. The latest release is called '7.04: The Feisty Fawn', but we used the slightly older 6.06 because of the longer support cycle — it's meant to be used with servers. If you run into any problems setting up your Linux NAS device, there's an excellent Ubuntu wiki at <https://wiki.ubuntu.com> that will step you through most things, including an excellent document on setting up Samba. For remote administration with Webmin, download the 'deb' package from www.webmin.com and install it by typing 'dpkg -i webmin.deb' as root.

for your data, and the drive array will still be more than fast enough to cope with any number of demands from the devices connected to your network. Most modern motherboards will include a hardware RAID controller, and even without the hardware, a RAID configuration can be recreated using software alone. If you have a choice, try and use a true hardware RAID controller. This avoids the added complexity of setting up software RAID and gives you the greatest benefits without the risk of messing something up. Configuration is also handled by the system BIOS; you'll simply need to let it know which drives you want to use in your array and the system BIOS; you'll simply need to let it know which drives you want to use in your array and the RAID mode you want them to operate under. It's then a simple case of installing the software.

INSTALL LINUX

Did we just say simple? Surely things can't be all that simple if Linux is involved. But it's true. Linux was built as a server platform, and it can be configured to share your music collection without breaking into a sweat. There are



Ubuntu is considerably easy to use — there's a graphical disk partitioning tool called GPartEd.

For sharing from the Ubuntu desktop, select 'Shared Folders' from the 'Administration' menu.

SSH, the secure shell, provides remote access to your Linux-based user accounts and is perfect for routine administration.

hundreds of Linux distributions to choose from, but we would recommend the server version of Ubuntu 6.06 LTS. There's also a desktop version, which is easier to install and configure as it features a graphical interface. Using the desktop version, you'll also be able to access the desktop remotely using VNC — very useful for remote administration. But if you're not interested in GUIs, the server version includes everything you need, and they both require the same configuration to share files on the network. The 'LTS' stands for 'Long Term Support', and the company responsible for this distribution has pledged security updates and support for this version until 2011. By that time, your 500GB hard drive will probably only be able to store a couple of hours of ultra super high-definition video.

The Ubuntu 6.06 LTS download is supplied as

HANDY TIP

If you're going to hide away your Linux-based NAS under the stairs or in the spare room, getting to it to make configuration changes may prove slightly awkward. Fortunately, there are several ways around this. The easiest is to install open SSH on the Linux machine (type 'apt-get install openssh-server' as root to install). You can then use a Windows SSH client, such as Putty, to connect to the command line on the Linux machine.

an ISO disc image, and you will need to burn this to a blank CD to turn it into a bootable disc. Once you've done this, installing Linux on a machine that's a couple of years behind the cutting edge will be easy. Just insert the bootable Linux disc into the CD-ROM drive, make sure the BIOS boots from this drive first and restart the machine.

Ubuntu will only ask a few questions, the most important being where to install the operating system and how you want to partition your drive. Remember, if you're using a hardware RAID controller, Linux will be oblivious to just how many drives there really are, only seeing RAID as a single drive. It's worth spending a little time creating three separate partitions, one small one for the Linux operating system (5GB is more than enough), one tiny one for the Linux swap file (just swap for the file system — this only need to be around 2GB in size), and use the rest as a single large partition for your data. The only thing that's particular to Linux in any of this is the 'Mount point' field. This is where your partition will be mounted within the file system — Linux, like Unix, presents the complete installation as a single file system.

The operating system needs a mount point of '/', also known as the 'root', and you should choose a mount point of something like '/srv' for your large, data partition. The Ubuntu installer will also let you create a software RAID configuration, which will be applied to your currently installed disks. Just select 'Create MD device' from the menu and make your choice

between RAID 0, RAID 1 and RAID 5 modes of operation.

CONFIGURATION

You will also be asked to create a user account and assign a password before the installation process goes on to install the software. After this has finished, you will be asked to remove the Ubuntu disc from your machine and restart. Thirty seconds later, you'll see the Ubuntu login prompt. Enter your username and password and the Gnome desktop environment will load Linux to your machine. Install and configure the file server software before connecting to your NAS from another machine on the network.

There isn't really much choice when it comes down to which server to use. FTP, SFTP, HTTP and NFS are all possibilities but, for Windows compatibility, Samba is the only realistic option. This is an open source recreation of Microsoft's 'Server Message Block', the standard networking protocol used to connect Windows machines over a network, and it works exceptionally well.

To install and configure Samba on your new Linux box, first log in to your account. If you're using the desktop version, open the Terminal from the 'Accessories' menu — server users will already be at a command prompt. Switch to the administrator's account by typing 'sudo bash' followed by your password. To install Samba, type 'apt-get install samba samba-common'. Finally, we need to configure Samba to share a directory on your Linux system with the wider network. Type 'nano /etc/samba/smb.conf' to open the Samba configuration file in a text editor (although desktop users may prefer a GUI — try 'gedit' instead). You will then need to change the 'Workgroup' field to the network name of your own Windows network, then page down to the bottom of the file and type in the below code (we've used '/srv/nas' as the directory location for the NAS files).

```
[nas]
path = /srv/nas
available = yes
browsable = yes
public = yes
writeable = yes
[end code]
```

You will now be able to browse to your NAS device through the 'View workgroup computers' option within the 'My Network Places' page in Windows. To enter the location manually, use '\\machine-name\nas' as the URL. The machine-name is the host name you selected when installing Ubuntu. You can then treat this remote location as if it were a real, local folder. This also works with an Apple Mac running OS X. From 'Finder', select the 'Go' menu, followed by 'Connect to server' and use 'smb://machine-name/nas' as the location. The remote directory will now be mounted onto your desktop. **FILE**



Code Office toolbars

Simon Bisson helps you build your own functions into Microsoft Office, starting with OneNote.

WHAT'S COVERED

WORKING WITH OFFICE

This section provides hands-on and theory-based programming that helps you develop your programming skills.

PROJECT GOAL

Code Office toolbars using COM add-ins and with OneNote's XML internal data structures, we'll produce an application that will add content to a OneNote page from a toolbar.

REQUIREMENTS

ONENOTE 2007

Microsoft's electronic notebook, and one of Office's hidden jewels.

VISUAL STUDIO 2005

Developer IDE for Microsoft's .NET and COM platforms.

OFFICE 2007 PRIMARY INTEROP ASSEMBLIES

A set of interfaces to help link Office and .NET.

One of the more important — and useful — parts of Microsoft's Office Suite is OneNote. It's also one of the least used. That may be down to Microsoft's packaging policies, as the latest version is missing from most of the main packages. However, it has finally found its way into the Student and Teacher edition, meaning more people should get to use this unseen Office treasure. Even if you do have a copy, the odds are you'll have looked at it quickly, decided it wasn't for you, and gone on to Word and Outlook. It's time to give OneNote another chance — both as a productivity tool and as a development platform.

At first glance, OneNote is fairly simple; an electronic version of the paper notebooks and scrapbooks we all use every day. However, it's that very electronic nature which makes OneNote a very powerful tool. Notebook pages can be searched, backed up and even shared and edited by two users at once. OneNote isn't just a note-taking tool, it's an outliner, a to-do list, and if you do it with a notebook or a diary you'll be able to do it in OneNote. That's a stiff promise to deliver on, but the software succeeds. It may not have the polish of the rest of the 2007 (or 2003) Office suite, but what it lacks in a sophisticated UI it makes up for in utility.

Often thought of as a killer application for Tablet PCs, OneNote lets you use a pen or a keyboard to write notes. Each page is as long as you want it to be, allowing you to bring all the notes for one meeting into one place. Sound-recording tools let you capture every detail of a meeting (there's even video if you have the disk space). Each sound file is time-coded against your notes, so if you find a note that's unclear you can quickly check a recording of the meeting to hear exactly what went on.

Certainly, using a pen makes things easier. You can scrawl notes and diagrams in various pen colours and sizes. OneNote doesn't convert handwritten ink text to typed text — instead it recognises the text in the background and uses it to build an index. The same technique applies to photographs or screenshots — a built-in OCR tool will recognise any text in your images and add them to an index. So if you're in a meeting and your contact has run out of business cards, just take a photo of one and add it to your note file later.

ONENOTE FEATURES

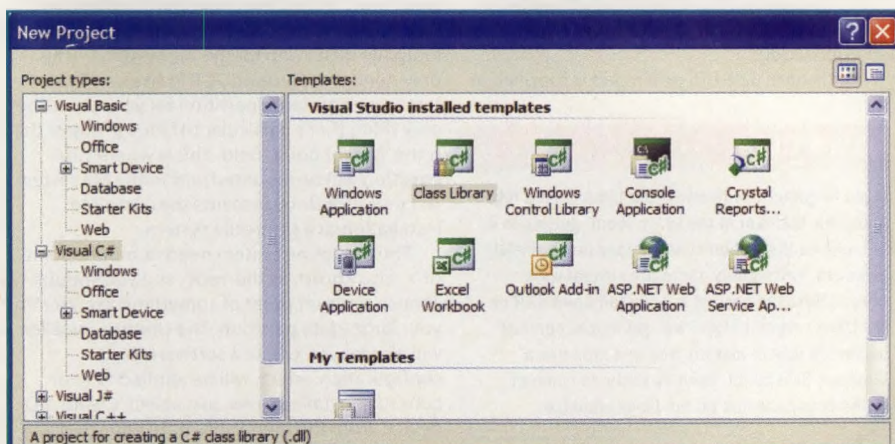
Notes can be turned into Outlook actions and tasks, and flags can mark significant sections of text. You'll find OneNote also installs a quick startup tool in the Windows task pane which

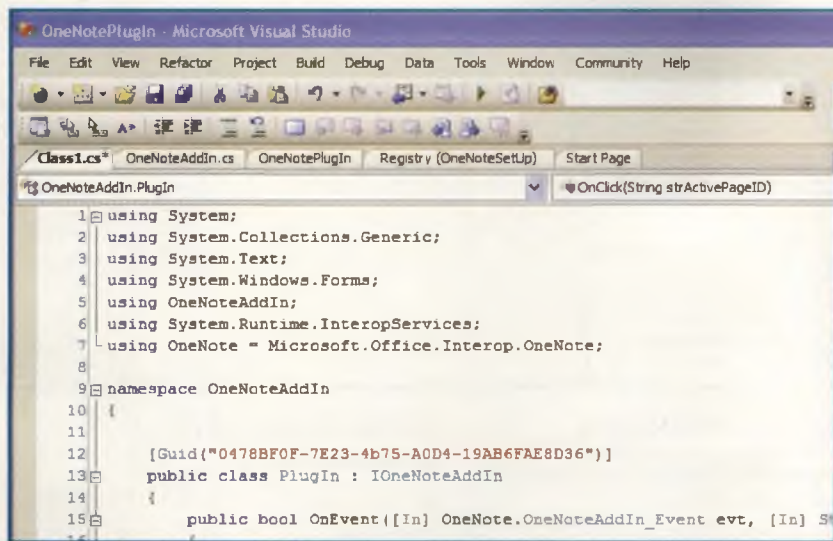
HANDY TIP

OneNote's scrapbook nature makes it a useful tool for managing a blog. You can use it to keep clippings of favourite links and to jot down thoughts and notes. Then, use the built-in formatting tools to write a blog post. When you're ready to upload to a server, go to the File menu, choose 'Send To' and pick 'Blog'. OneNote will transfer your content to Word 2007's blog-posting tool, where you can finalise your formatting before publishing.

While OneNote uses Microsoft Word to handle blog posts, its add-in capabilities and XML file structure should make it relatively easy to write tools to pass content to other blogging tools — or even publish directly, without leaving your notebook.

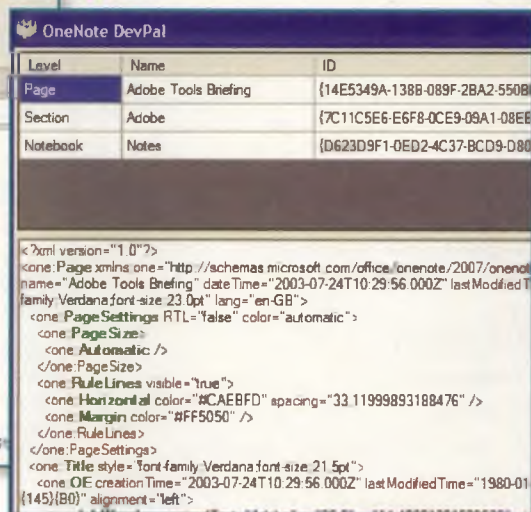
Start by creating a new project, using a C# class library to hold our OneNote add-in. We'll also link to the OneNote 2007 COM interop tools.





You won't need VSTO to build your OneNote add-in in Visual Studio 2005.

OneNote DevPal displays the XML structure of a OneNote document, along with all the document IDs.



allows you to add what Microsoft calls Side Notes and web page clippings to a notebook. The clipping tools are very useful, and can be used to quickly take snapshots of registration codes and the like. OneNote also installs a printer driver, so you can print PowerPoint slides to OneNote, ready for you to annotate during a presentation.

While Office 2007 brought a refresh, OneNote 2007 has added phoneme-level audio indexing so you can search sound recordings alongside text. Mobile users can store files on a central server, updating a local cache when on the road, and synchronising stores when back at base. The new version has also brought in a new tool, a mobile version that runs on Windows Mobile Smartphones and PDAs. There are still some flaws with OneNote Mobile: you can't store a PC-side copy of a mobile notebook on a server, and there's no way to store mobile notes and recordings on a memory card. Even so, it makes a useful adjunct for the days you've left your laptop at home.

Like the rest of Office, OneNote 2007 is designed to be extended. You can write your own extensions, and use them to link OneNote to other applications — or add missing functionality (one of our favourite plug-ins is a word count tool).

Unlike other parts of the Office suite, OneNote isn't supported by Visual Studio tools for Office, so any development work you do needs to be from scratch. That's not to say it's complicated — and the OneNote team at Microsoft have provided plenty of help through postings on their blogs. The MSDN site is still a little bare, with one set of developer documentation. Here we'll use the guide from Daniel Escapa's blog (written for the beta, so there are differences with the final release version) to help build a simple toolbar add-in.

You can use the resulting code as a template for more complex applications. First — make sure you have the 2007 Office primary interop

DO THIS...

OneNote 2007 installs a new printer driver: Print to OneNote. You can use this to quickly deliver any document or file to OneNote. As long as it can be printed, it can be used in OneNote (and recognised by its built-in OCR tools). If you've got the PowerPoint slides for a presentation, print them to OneNote and then annotate during the meeting or conference session. You can even use the OneNote

assemblies installed. You'll need these to write access OneNote's COM internals from .NET code.

LIBRARY SETUP

Start by opening Visual Studio 2005 and create a new project. You'll need to create a C# class library. This is the same approach you'd use for any C# application that's going to be hosted by another piece of code. We'll call our project OneNotePlugin. Once we've created the project, we'll need to add a reference to OneNote so we can use OneNote's COM interfaces from our .NET code. In the Solution Explorer, right-click on References and add a reference to OneNote 2007. In the Add Reference dialog, switch to the COM tab. You'll need to scroll through the long list of available components to find Microsoft OneNote 12.0 Object Library. Once installed you'll see a reference to Microsoft.Office.Interop.OneNote.

Next, go ahead and create a C# file. This is where we'll start to write our add-in code. First, we'll build an interface to OneNote's COM interop tools, and use it to handle click events from OneNote. Create a new C# class to host the interface and add the following code:

```
using System;
using System.Runtime.InteropServices;
```

WORK WITH THE ONENOTE PRINTER DRIVER

printer to work with PDF files. Microsoft's new scripting tool, PowerShell, can work with the printer. You can use it to collect information, then pipe the results straight into the OneNote printer. The information can then be examined and shared at your leisure. It's an ideal way of working with the large amounts of information that can be generated by many system level activities.

```
using OneNote = Microsoft.Office.
```

```
Interop.OneNote;
namespace OneNoteAddIn
{
    [ComImport, Guid("C9590FA7-2132-47fb-9A78-AF0BF19AF4E6")]
    public interface IOneNoteAddIn
    {
        bool OnClick([In] String strActivePageId);
        bool OnEvent([In] OneNote.OneNoteAddIn_Event evt, [In] String strParameter);
    }
}
```

Once we've completed the interface code, we can go back to our original class and start building our OneNote application. We'll need to generate a unique ID for our application, so it can be installed and named correctly. You can use Visual Studio 2005's GUID generator to create this. If you don't find it on the Tool menu, you can find it as GuidGen.exe in the Common7\Tools directory of your Visual Studio installation.

OneNote's internal data structures are XML, and each page and section has a Unique ID. You can download a tool to investigate this structure in more detail — you'll find OneNote DevPal most



Using Visual Studio's installer tools, we can build the registry entries for our add-in.

helpful, as it shows page IDs and the XML structure of your notes. We'll need to generate some XML to edit the Title of a OneNote page. We can use a string to hold the XML we're using:

```
strXML = "<?xml version='1.0'?" +
"<one:Page xmlns:one='http://schemas.microsoft.com/office/onenote/2007/onenote' ID='\" + strActivePageID +
\"'?" +
"<one:Title>" +
"<one:OE>" +
"<one:T>" +
"<![CDATA[APC Note]]>" + "</one:T>" +
"</one:OE>" +
"</one:Title>" +
"</one:Page>";
```

You'll find this code will change the title of a note page to 'APC Note'.

First, what we'll need to do is get the active page ID so that we can wrap this XML string in the following code, which detects a click event on our OneNote menu button, returning the current page ID, before finally using OneNote's UpdatePageContent method to insert our XML string into the page.

```
public bool OnClick([In] String strActivePageID)
{
    OneNote.ApplicationClass onApplication = new
    OneNote.ApplicationClass();
    String strXML;
    MessageBox.Show("This is pageid:"
    + strActivePageID);
    MessageBox.Show("About to write page
    contents");
    [add XML string here]
```

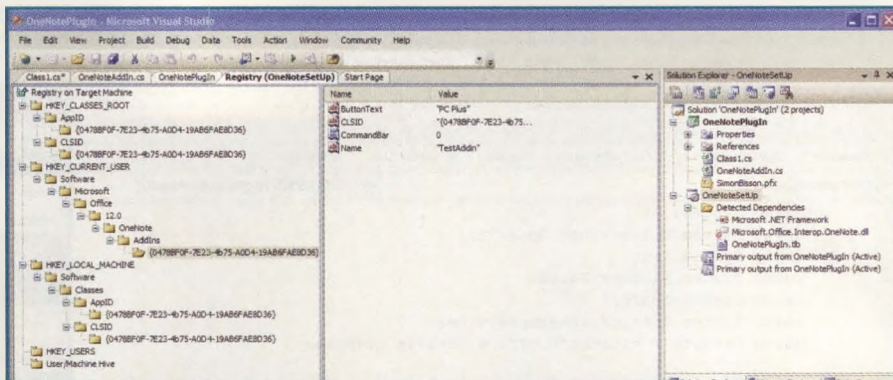
```
onApplication.UpdatePageContent(
strXML, System.DateTime.MinValue);
MessageBox.Show("Pageid: " + strActivePageID
+ "Has been updated");
return true;
}
```

We'll need to turn the whole thing into a COM add-in, so use the following code to build the rest of our application. You'll see that we're using the interface we defined earlier, while giving our add-in a GUID to make it easier to install in the registry.

```
using System;
using System.Collections.Generic;
using System.Text;
using System.Windows.Forms;
using OneNoteAddIn;
using System.Runtime.
InteropServices;
using OneNote = Microsoft.Office.
Interop.OneNote;
namespace OneNoteAddIn
{
    [Guid("Generated GUID goes here")]
    public class Plugin : IOneNoteAddIn
    {
        public bool OnEvent([In] OneNote.
```

by the Outline element, which can contain text and binary objects.

You can find out more about the OneNote 2007 XML Schema in the second part of Microsoft's What's New for Developers in OneNote 2007: <http://msdn2.microsoft.com/en-us/office/ms406044.aspx>. The document is slightly out of date as it was written for Beta 2 – but there have been minimal changes to the final file structure. You can also download the 2007 Office Schema reference as a Windows Help file.



```
OneNoteAddIn_Event evt, [In]
String strParameter)
{
    return true;
}
[Add insert code here ]
}
```

Finally, we need to set application properties. Right-click on the project in the Solution Explorer, then in the Application tab click Assembly Information and set the application to be COM-Visible. In the Build tab click Register for COM Interop. Finally, sign the application, generating a key name file if necessary.

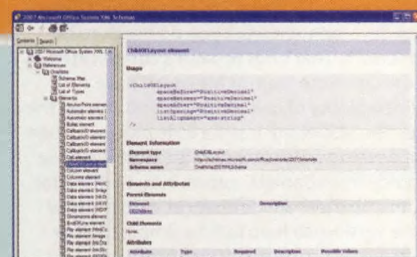
You'll need to build an installer for the application, which needs to make appropriate registry entries to define where on the OneNote menus our button will go, as well as registering the COM add-in with OneNote.

There's a lot of detail on building an installer in an article by Microsoft OneNote developer, Daniel Escapa (<http://blogs.msdn.com/descapa>). It's called Creating a Toolbar Add-in for OneNote 2007 and it's downloadable from his blog. Our basic OneNote add-in can act as a template for more complex tools. One option would be to use it to generate pro-forma structures for meeting minutes, or to produce standard header fields for specific note types. Once you come to grips with OneNote 2007's internal XML structures, the sky's the limit.

SPOTLIGHT ON...

THE ONENOTE XML STRUCTURE

OneNote 2007 uses an internal XML data structure to manage the content of its notebooks. When a notebook can contain sound, images, typed text, handwritten text (and can be edited by more than one person at a time), an open file structure makes a lot of sense. The OneNote 2007 XML schema can have several different root nodes – from groups of notebooks to individual pages. Once you've navigated OneNote's XML hierarchy to a specific page, you'll need to work with its page elements. These are controlled



Discover the full intricacies of OneNote's XML schema on the Microsoft web site.

Overclocking, part 2

John Brandon has some juicy tips for squeezing more speed from your PC's motherboard, CPU, graphics and RAM.

WHAT'S COVERED

PROJECT GOAL

The project goal is to overclock the existing components in your PC. The main benefit is in realising a speed boost for compiling, video editing, image manipulation and gaming. Remember though, you can damage your PC by overclocking, so progress with care.

REQUIREMENTS

A MODERN PC

Though some of the overclocking methods explored here will work on older machines, you stand a greater likelihood of success if your machine is new.

LAST ISSUE

- Last month we covered overclocking's basic concepts. We also looked at cooling and learned how to keep temperatures down.

THIS ISSUE

- We'll look in detail at how to overclock key components inside your PC.

For some people, pushing a PC beyond its limits is a hobby. For others, it's an obsession. And that's the great thing about overclocking — there's something for everybody, assuming you're prepared to put in the research and effort. If you're after a few extra frames-per-second in games like *Splinter Cell: Double Agent*, then they're within your reach. Alternatively, if you use your PC for work, extreme computing means shaving minutes from filter-processing time in Adobe Photoshop CS3 or rendering a drawing in Autodesk Maya in an afternoon, rather than having to wait all night.

Overclocking has a real pay-off in terms of making your work more enjoyable, lowering processing times so you can get more work done — or leave early for the day — and helping you get more out of a system you already own without upgrading. In fact, you can likely get another full year of usage out of a PC once it has been properly overclocked for the fastest speeds. So, let's get cracking.

OVERCLOCKING COMPONENTS

In part one of this workshop we covered the software and water-cooling required for overclocking a PC. The Intel Thermal Analysis Tool CoreTemp and PC Probe are all-important tools on the overclocker's belt. Liquid-cooling options from Swiftech and Zalman help you reduce heat build-up in your case when you

start adding voltage to the processor core. Some systems, such as the new Dell XPS 710 H2C, provide commercial liquid cooling to address the immense heat that emanates from overclocked components. We also provided the steps for overclocking a specific motherboard and CPU.

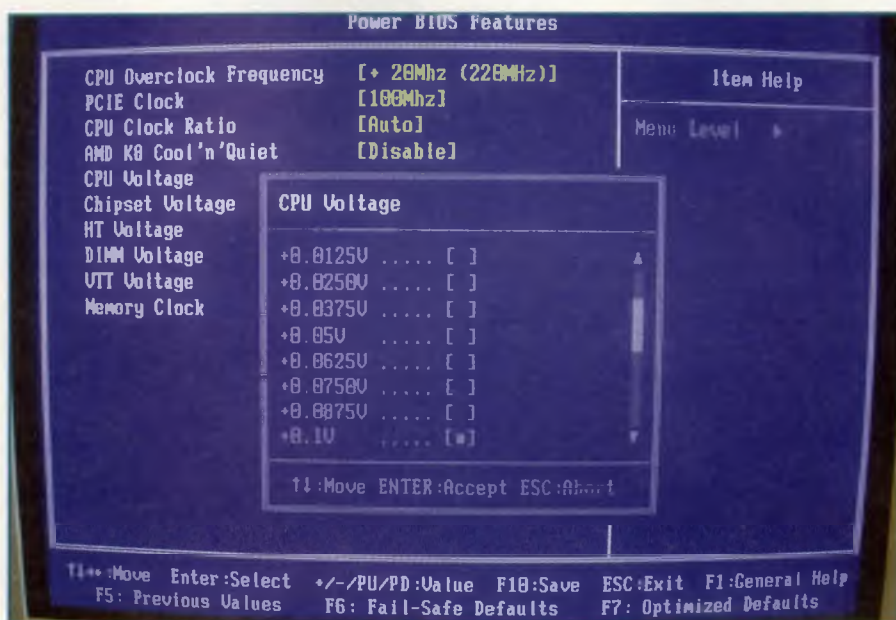
In this second part of the tutorial, we'll explore two more aspects of overclocking. One, increasing the speed of RAM, graphics card, and other gear inside your PC. All the while, we'll keep the kit used in this tutorial as general as possible — with tips that apply to any power user, rather than being limited to those who can afford the premium, expensive gear. That way we can all benefit and enjoy overclocking's exciting fruits.

Once you have a stable system running with a faster processor, you can start moving on to other components inside your case. The first

HANDY TIP

No matter how little you increase voltage, even if it's by a small amount, you are degrading the components in your computer. Each incremental adjustment means the component (including CPU, motherboard and graphics card) will wear out faster, which is always the trade-off when you dabble in extreme computing.

Overclocking the RAM on your PC means adding a small tweak in voltage to increase the processing time — and adding more clock speed.





DO THIS...

OVERCLOCKING STEPS

STEP ONE: Almost any computer can be overclocked. Follow these steps to overclock an AM2-based motherboard and AMD processor system. First, to enter the BIOS, boot your PC and press the modifier key (such as Delete) to enter the BIOS. Now, look for a setting called Power Settings or Power BIOS, which is where you'll make changes to the BIOS settings to overclock your PC.

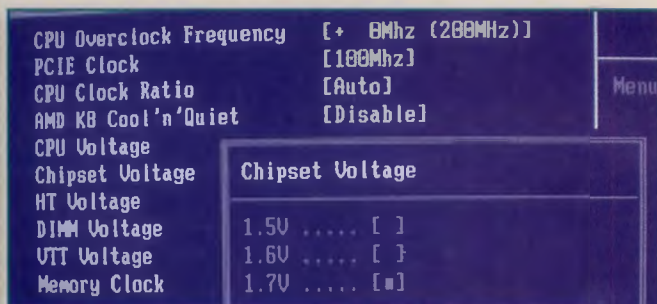
STEP TWO: The most important settings to look for are the CPU Overclock Frequency, CPU Voltage,

Chipset Voltage and HT Voltage. On an AMD processor, the HT stands for HyperTransport — on an Intel system, HT stands for Hyper-Threading. Both terms are important for overclocking, because they determine the speed at which the components in your PC communicate. Adjust the HT setting up just one or two increments and test.

Note: when you increase HyperTransport or Hyper-Threading voltage, you're effectively supercharging the integrated circuits in your PC so they run faster. Obviously, this can have a detrimental

effect on those components over long periods, so increase the HT setting in small increments.

STEP THREE: Once you've adjusted settings, press the modifier key (usually it's F10) to save and quit the BIOS. Your PC will reboot, and you can now test out the system for stability and heat build-up. If the PC crashes or won't boot at all, it's overheated. Leave the system turned off for a few minutes, reboot, enter BIOS, and lower the settings until you can boot normally and the PC doesn't crash.



area to consider is RAM, which can be overclocked simply by adding more voltage and clock speed to the memory modules. First, we should mention that some RAM is more suitable to overclocking than other modules, because they can withstand the increased temperature that will be generated throughout this. Crucial Ballistix modules, for example, come with heatspreaders — metal clips on the side of the modules that help dissipate the heat when you overclock them.

To overclock RAM, start your system and enter the BIOS, then look for the Power option. Look for both the DIMM voltage and memory overclock settings and increase the setting in fine increments. Each time you add more power or speed, reboot and make sure your system stays stable. You can keep overclocking the RAM until you're completely satisfied that the speed matches well with your overclocked CPU. Once again, do a before-and-after test in a memory-intensive program, such as Adobe Photoshop CS3. Run a filter before overclocking RAM and time how long it takes, then try overclocking and re-running the same test. Shaving even a few seconds from a filter can save you time each day, especially if you tend to make adjustments on large photos.

Next, let's look at how to overclock your graphics card. You can fortunately skip the BIOS settings altogether and use one of several overclocking programs, some offered by the graphics card maker itself, to increase the speed of graphics processing. Note that overclocking graphics doesn't mean you're adding more resolution or even refresh rates to the card, but you're adding more speed to the processing capability for gaming and even photo editing.



OVERCLOCKING HAS A REAL PAY-OFF IN TERMS OF LOWERING PROCESSING TIMES SO YOU CAN GET MORE WORK DONE

ATI provides its Catalyst software (<http://ati.amd.com>) for free, just be sure to download the full package, not just the driver. We tested it with the ATI 1950 SLI and could easily add more processing speed using what ATI calls its Safe GPU overclocking, which protects your graphics card from overheating.

Nvidia provides its nTune utility (www.nvidia.com), which includes options for adjusting graphics core voltages for optimal performance. However, both of these tools come with a caveat: they may not work correctly with all video cards. For example, we tested the nTune utility with a Gigabyte GeForce 8800GTS 640MB, one of the best cards on the market for video, photos and gaming. The utility starts normally, but doesn't let you access any of the voltage settings. Since the 8800GTS is designed for Vista, which supports DirectX 10, the problem could be that the nTune utility

doesn't work properly in Vista. Instead, for better compatibility, we recommend the ATITool (www.techpowerup.com/atitool) for both cards.

Despite the name, the ATITool works with both ATI and Nvidia cards. The software lets you click one button to test for maximum speed, which kicks off a series of tests on the graphics card to automatically adjust voltage settings for the best performance. Just download the tool, click the auto-adjust options, and you can start using your overclocked card.

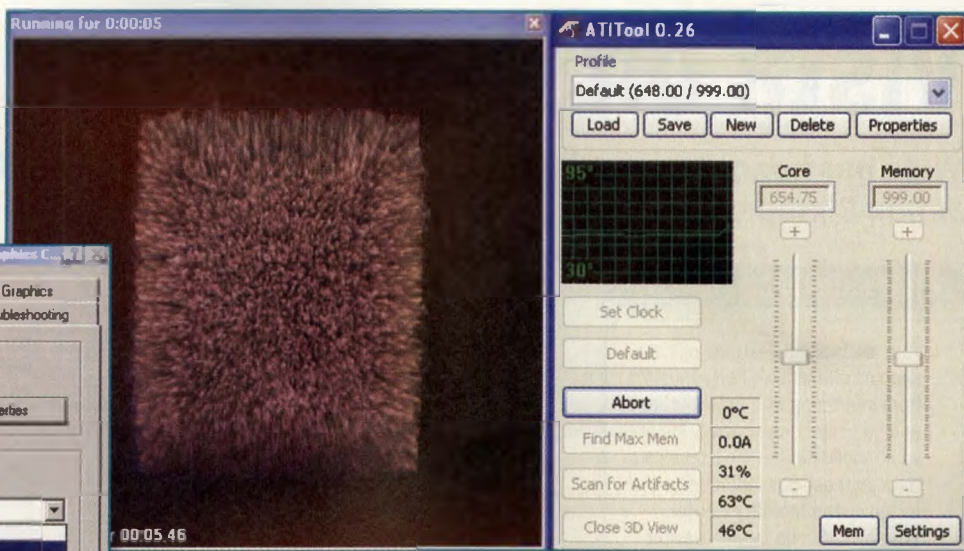
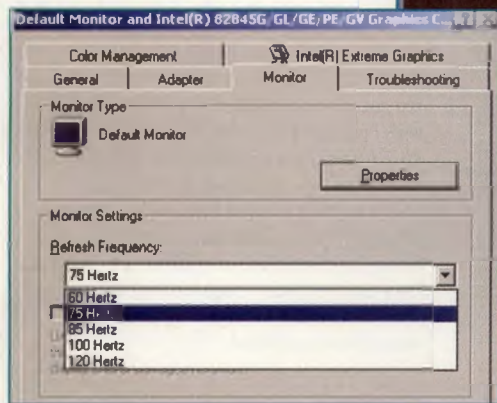
ODDBALL OVERCLOCKS

Other than the CPU, motherboard and graphics card, the other components in your case aren't as optimal for overclocking. However, that doesn't mean you can't try. If you're running Windows XP (don't try this with Windows Vista, since it will cause a horrendous crash), you can overclock your mouse speed using USB Mouserate Switcher, available at www.softpedia.com, (it's a free download). First, you'll need to reboot your computer and select Safe Mode at start-up. (Press F8 repeatedly before Windows loads and then select Safe Mode in the menu and press Enter). Once booted, run the USB Mouserate Switcher utility and select 250Hz or 500Hz as the refresh rate. You can try the 1,000Hz rate, but it's known to cause frequent crashes. Your mouse will be livelier, but if you are using a high-

HANDY TIP

Overclocking can be a trial-and-error experience, although an error can involve burning out your motherboard or CPU. We certainly recommend searching the internet for the name and model of your motherboard and CPU with the term 'overclock' or 'overclocking' to see what other users have tried successfully, before just punching in random settings — and getting constant errors.

The ATITool runs a series of tests for the best performance with your specific card and your PC configuration of motherboard, RAM and CPU.



Changing the refresh rate on your LCD monitor is technically a form of overclocking.

resolution optical mouse, the movements may be a little too abrupt for some users. Still, if you're a hardened gamer for whom a split-second can mean the difference between life and death, an overclocked mouse may be the way forward.

Finally, you can overclock your DVD drive. Now, this is stretching the definition of the overclocking somewhat, but by ensuring your drive is using the very latest firmware you can often gain access to new features, obtain compatibility with more types of media and get increased read and write speeds. In this respect, ensuring your DVD drive is running the latest firmware is very important. In fact, it's more important than for other components inside a PC.

Of course, upgrading the firmware used by any component does carry risks, so we recommend doing your research. First, discover the exact name and model number of your drive — use Windows Device Manager for this and, to be ultra safe, check in the BIOS too.

Armed with the precise information, visit the drive manufacturer's web site and read the release notes for new firmware updates. As manufacturers often have subtly different versions of drives, pay close attention to names, version numbers and revision codes.

If you catch sight of updates adding new features or increasing read or write speeds, download the necessary files and executables and run them in careful accordance with the maker's instructions. If the release notes suggest there are no clear benefits achievable through a firmware upgrade, give it a miss. It's not worth the risk.

It's also worth keeping an eye on www.cdfreaks.com. Here you'll find a thriving community of people keen to share information about the very latest firmware updates for CD and DVD drives. More extreme members of the site's forum are exponents of cross-flashing. They claim that by using firmware designed for other drives, they can extract new features like dual-layer compatibility. It's

believed NEC drives are particularly flexible in this respect. Others even develop their own hacked firmware. See <http://liggydee.cdfreaks.com/page/en/NEC-ND-6500A/> — all we can say is tread with care.

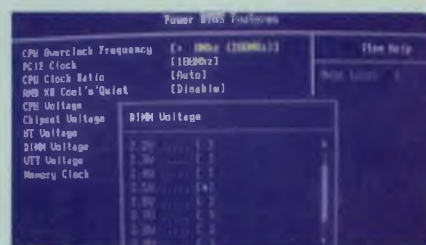
TROUBLESHOOTING

So, what do you do if overclocking causes your PC to crash repeatedly? What if you can't even get back into the BIOS and lower the voltage settings? First, remember that repeatedly restarting a overclocked system that won't boot can cause damage. With the heat build-up from the CPU, you can destroy the chip itself, the motherboard and even attached components. In this scenario, stop and clear the motherboard's CMOS. If you've used a software tool such as ATITool to increase your graphics card's core settings and have found glitches and lockups are happening, return the device to a more conservative setting. Problems rarely get better by themselves — and you risk damaging your precious PC. ☹️

SPOTLIGHT ON... ADVANCED OVERCLOCKING

Overclocking is a process of adjusting many different BIOS settings for the best results. CPU and chipset voltage adjustments are the most obvious ones to make because they add more power to those components. On some systems the BIOS setting to look for is FSB (frontside bus) frequency, which typically runs at about 800MHz on most systems. You can increase this speed to make your motherboard run faster, and therefore all of the components will get a speed boost. In general, all of the adjustments you make must work together for a total boost. In

some cases, for example, you can lower the HT setting on a motherboard and raise the CPU voltage setting even higher than normal for the best results. Most newer motherboards, such as the Epox MF570 we used, won't let you use settings that will cause damage to your PC. When you boot the system, it'll shut down immediately. Typically, you can leave the system off for a few minutes so it cools down, then reboot and quickly enter the BIOS to lower your voltage and frequency settings. Doing this repeatedly can cause damage to components, especially the CPU.



The BIOS setting to boost is the FSB frequency.



Vista on the go

Vista has been designed to work on the road as well as on the desktop —
Simon Bisson gets mobile.

WHAT'S COVERED

- The new mobility features of Vista simplify offline files, keep your IMs from interfering with presentations and can extend the battery life of your mobile device. We'll take you through these new additions, including the **Mobility Center**, **Windows Mobile Device Center** and the **Sync Center**. We'll also look more closely at **BitLocker**.

With laptops and notebooks currently outselling desktop PCs, it's no wonder that Microsoft has concentrated on getting Vista's mobility tools just right. Vista makes it easier to manage battery life, to quickly change settings when on the road, and to share information with mobile devices. You don't even have to work on a notebook to use these features — many will work with desktop versions of Vista.

The most obvious mobility tool in Vista is the aptly named Mobility Center. You'll get a different view of this depending on your notebook's hardware. The Center hosts a set of tiles, each of which acts as a shortcut to functions that would normally be buried deep in the control panel. If your notebook doesn't support a specific function, you won't see the appropriate tile at all.

Common tiles include tools for changing screen brightness and system volume, switching power settings and monitoring battery status. If your graphics adaptor supports it, you can also manage external displays, and there's also support for turning wireless networking on and off. Add a shortcut to the Mobility Center to your Quick Launch menu so you can quickly open it from the task bar, without having to go through the Start menu every time.

You might like that picture of a kitten with a sailor suit, but it's not the best wallpaper to have when making a sales presentation to the finance director of your biggest client. You also don't want them seeing that their competitor is trying to IM you — or that you need to pick up a loaf of bread on the way home. That's where Vista's Presentation Settings tools come in helpful, giving you a one-stop shop for hiding pop-ups and personalised backdrops.

HANDY TIP

You can get more battery life and improved performance just by plugging in a USB flash drive. Vista's ReadyBoost system will use the USB stick as an extra level of disk cache, so you're not driving the disk all of the time. Not all USB sticks will support ReadyBoost, because they need to have good random access read/write capabilities. The next generation of laptops — using Intel's Santa Rosa platform — will have built-in flash memory for ReadyBoost.

The Presentation Settings tile can be set up to switch your notebook to a neutral backdrop and to turn off any system notifications. It'll even stop your screen saver from kicking in if a detailed PowerPoint slide takes a few minutes to explain. Just set up the options in the control panel and then click the Turn On button in the tile. Vista's Presentation Settings use their own power management rules, so you may see a reduction in battery life if you're not plugged in.

Tablet users will be able to use the Mobility Center to change screen orientation. Just tap or click on the Rotate Screen button in the Screen Orientation tile. It's a surprisingly easy way to quickly switch between modes, especially if you want to quickly drop into Landscape mode to finish a sketch or view a particularly wide web page.

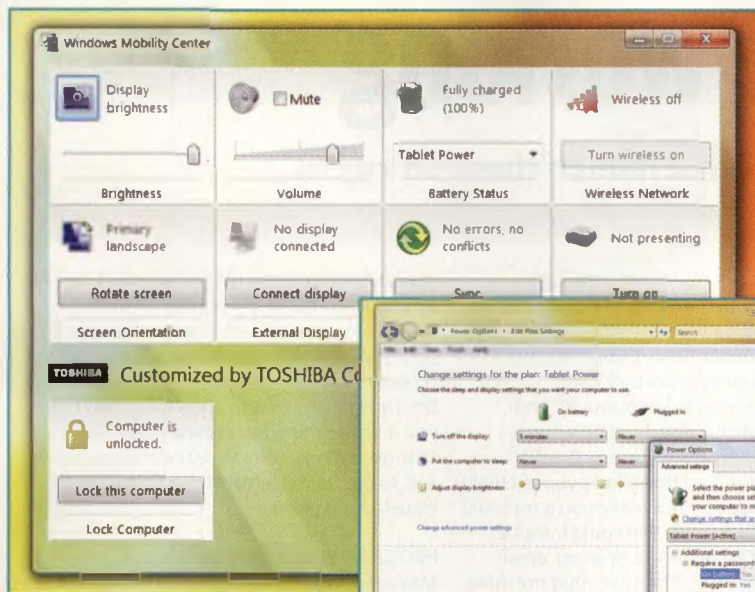
Microsoft has opened up the Mobility Center to third parties, and notebook manufacturers like Toshiba have already shipped their first tiles. Install Toshiba's Vista drivers and you'll find a new tile added, in a Customised by Toshiba

SPOTLIGHT ON... BITLOCKER

We've seen the news headlines: "Laptop lost, millions of personal records at risk!" The past has shown it's easy enough to break through most encryption systems. But what if you could use hardware to encrypt a disk so securely that it would become uneconomical for identity thieves to even try to read sensitive files in the first place?

Vista's BitLocker whole drive encryption tool will do just that. You'll need a notebook with a TPM 1.2 chipset to get the most from BitLocker. You can use a USB key to store encryption keys, but this approach doesn't offer the secure startup features of a TPM.

The Trusted Platform Module is a hardware encryption tool that lets you see if anyone has meddled with a hard disk, preventing access if there have been significant changes to hardware. If the TPM detects a change, it locks down access, and will require a recovery key before you can use the disk. Vista uses the TPM to hold the encryption keys for your hard drive. You'll need two partitions: one to hold encrypted data (It also includes Windows) and an active partition to manage booting. You can use BitLocker in two ways: transparently, where users log onto Vista as normal, or with user authentication, using a PIN, a USB key or both.



Third parties can add their own tiles to Vista's Mobility Center, such as the "Customised by Toshiba Corporation" featured here.

Use the Mobile Device Center to manage your PDAs and smartphones. The connection setup is similar to — and also simpler than — that of ActiveSync.



The Power Options dialog allows you to make your own power profiles and tweak them to give you as much battery life as possible.

section of the Mobility Center. This does mean losing more screen real estate, because it adds a new line — and a header — for just one tile. There's no way to customise the Mobility Center, so once it's been added, a tile can only be removed by uninstalling the software.

Power is an important issue for notebook PCs. The basic power management profiles are good, but you can get more out of your battery if you delve into the advanced settings in the Power Options control panel. Vista has a much wider range of power management settings than Windows XP — you can even control how the index service runs if you're on battery or plugged into the mains. As well as the default power profiles, you can build your own, giving your notebook maximum battery life on the road, and maximum performance when plugged into the mains.

One thing that you should check is that the Wireless Adapter Settings are set to use maximum power saving when you're on battery. If you're using the Balanced power profile, Vista won't use the advanced power-saving features

built into many 802.11 network cards, which may not be supported by some access points. Switch to maximum savings to get a few extra minutes of battery life — you can always quickly switch back if you find you're having problems connecting to a network.

Notebooks aren't the only mobile devices for Windows Vista. If you've got a Windows Mobile PDA you'll need to get to grips with Vista's new Windows Mobile Device Center. Simplifying the often complex ActiveSync, the Mobile Device Center clarifies how you work with your PDAs and smartphones.

Once installed, the Mobile Device Center won't appear until you connect a device to your PC. Like ActiveSync, you'll be walked through setting up connections to Outlook or to an Exchange server. While the screens may be clearer, this is still the familiar ActiveSync set up process. The main area of difference is in how Mobile Device Center handles media. Convergence has turned many PDAs into devices with relatively high-quality cameras, and the Mobile Device Center wraps Vista's photo import tools, making sure you can use them with PDAs, as well as with memory cards.

MANAGE OFFLINE FILES

The Mobile Device Center is managed by the Windows Sync Center. Another useful tool for mobile users, the Sync Centre is an improved version of the SyncToy Windows XP power toy. An unsupported add-on, SyncToy automates keeping two folders on different PCs in sync. Sync Center does much the same, and helps you manage your offline folders. You can also choose a set of server folders and set up a partnership.

To set up a folder as a source of Offline Files, navigate to a network folder and then right-click on the folder or on the files. Choose Always Available Offline. Once you've set up a connection, Vista will keep a local cache of the server files and update it every time you make a change to the files on the server, or when you reconnect after being on the road. If you're disconnected from the network you'll still see the share, but files and folders that aren't cached locally will be greyed out.

When you reconnect to the network Offline Files are resynchronised. Conflict resolution rules in Sync Center help handle files that have been changed on the server and that you've also changed while you were offline. It's best to choose a separate name for the file and then use document-versioning tools to reconcile changes. You can also use Sync Center and Offline Files to work with slow network connections, manually syncing folders and then working offline with the local copies. You can resynchronise when your edits are complete. This approach can be especially useful if you're using a VPN and a slow modem link. Sync Center also comes in handy if you're using a USB-connected MP3 or video player and Windows Media Player. Use it to set up partnerships and to trigger synchronisations.

Vista's mobility tools are a step up from XP's, and are well worth exploring in detail. There are a lot of features hidden deep in the menus and control panels, but most of the key options are easy to find and configure. Power users get access to fine controls that can eke out extra minutes, while everyone else gets one-button controls that provide pretty much everything you'll need for the home, office or road.

HANDY TIP

Vista adds plenty of new features for Tablet users, including a swathe of graphical tweaks that help show just what you're doing. One of these is a new right-click cursor. Hold the pen onto the screen, and a large circle sweeps around the point of your pen. If you're using a hybrid pen/touchscreen, you'll find another new cursor that indicates when you're using your finger instead of a pen.



Smart mobile working

Install programs on your U3 USB drive and launch them on any PC.

Mike Williams shows you how.

WHAT'S COVERED

PROJECT GOAL

USB flash drives are generally seen as an easy way to transport data: convenient, but perhaps a little dull. U3 takes the idea a step further, though, by letting you install programs on the drive and easily launch them from any Windows 2000, XP or Vista host computer.

REQUIREMENTS

U3 USB DRIVE, 2GB

A U3 USB drive, 2GB or more is best if you want to store a lot of programs. We recommend one as big as you can get, such as a SanDisk Cruzer Micro 4GB U3 USB Flash Drive.

WINDOWS 2000/XP

You can try this on Vista too but there may be compatibility issues.

HANDY TIP

U3 drives will work well with Vista, as long as they're equipped with Launchpad 1.4 or later. If you pick up an old drive then you may be able to find an upgrade at the manufacturers web site. That's not enough, though, because the programs you install still need to support Vista, and right now most don't. By all means try U3 if you're a Vista user, but expect your choices of applications to be limited for the next few months.

The U3 drive can take hundreds of compatible applications.

Documents, photos, music, email or contacts; your data is far too valuable to be tied to one PC. Sadly, most mobile computing solutions have serious flaws. Data entry on a PDA is difficult, while laptops are bulky and expensive, and having to keep your PC and mobile device synchronised can be a major hassle in itself.

U3 is a new standard that allows you to create your own customised virtual office on a specially formatted USB flash drive. You could install an application like OpenOffice, a browser, email client and media player. Then just plug the drive in at home, work, or anywhere else with a Windows PC, and you'll have access to all your programs and data.

Costing little more than standard USB drives, U3 drives can also be used just like any other, to drag-and-drop or save files as you like, so the next time you're looking for a flash drive it probably makes some sense to opt for a U3.

Once you're equipped with a suitable drive, select a Windows 2000/XP (or possibly Vista, though there may be some compatibility issues) PC and plug it in to a free USB port. Your system will then recognise it as two separate drives, the first being a special 4MB read-only partition that emulates a CD-ROM. Provided your PC is set up to AutoPlay drives, this should allow it to automatically load the U3 management software, which adds an icon to your system tray. If you've turned AutoPlay off, then run the

executable (probably called LaunchU3.exe) file in the root folder of the second U3 drive.

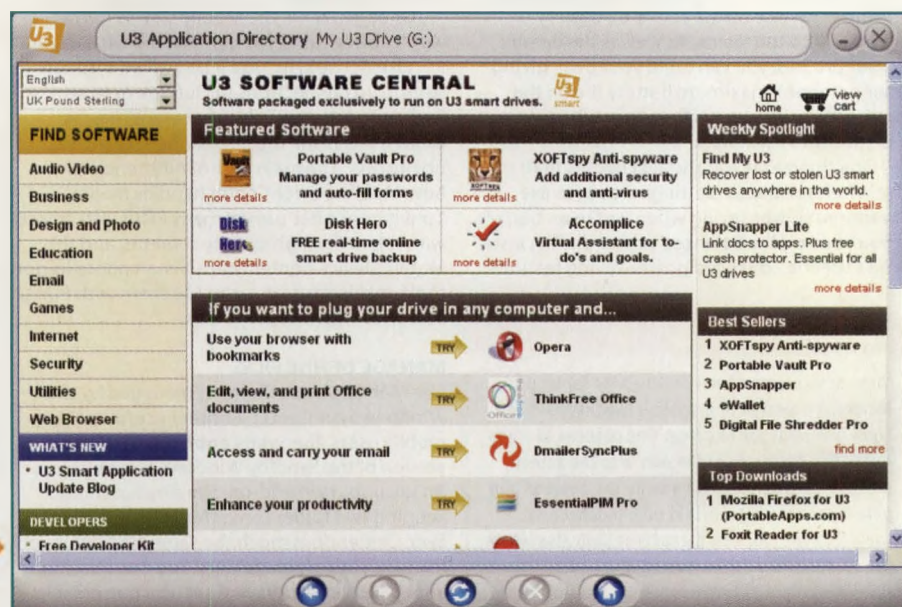
Click the new system tray icon and you'll discover the special Launchpad — heart of the U3 smart drive. This is split into two main areas. On the right are links to applets that will help you manage the drive, browse it in Explorer, change settings, turn on password protection, and so on. On the left are links to previously installed programs.

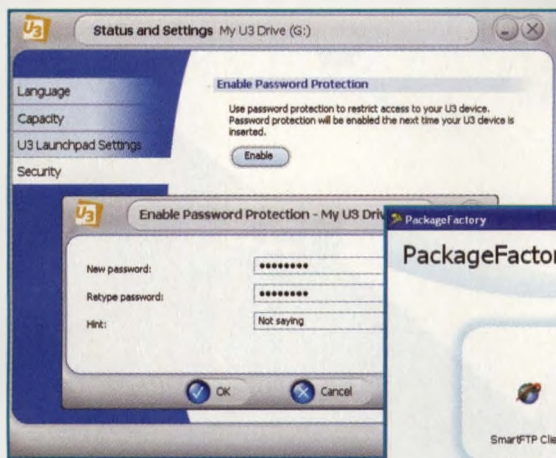
PROGRAM MANAGEMENT

Make sure you're connected to the internet, then click Download Programs. You'll be taken to U3 Software Central; a catalogue of all the U3 applications you're able to install. These are split into categories like Audio Video, Business, Email and Security, each of which contains up to 50 programs: there's OpenOffice, WinRAR, IrfanView, Mozilla Firefox and Thunderbird, Avast! AntiVirus and a whole lot more. Some are freeware, others open source, and most are commercial, every application is clearly labelled.

Select a program you want to try, like OpenOffice in the Business category, to launch U3's Add Program Wizard. It's supremely easy, with no need to choose a download location, run a setup file or complete installation options. Just keep clicking Next and the wizard handles everything for you.

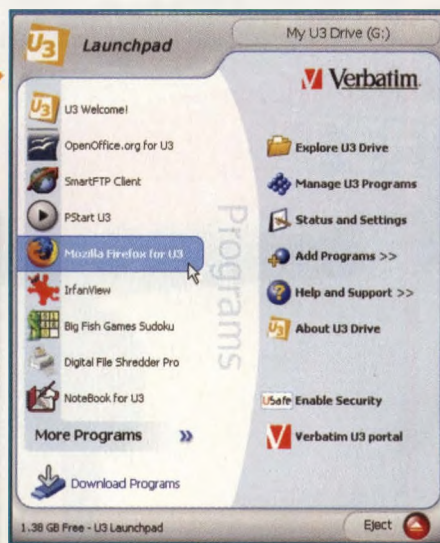
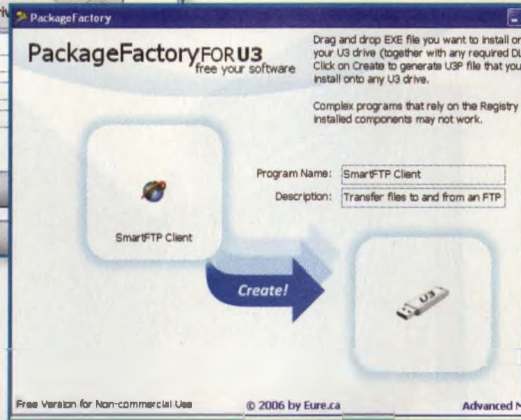
Click the U3 system tray icon again and this time an icon for OpenOffice will appear on the





U3 drives come with built-in password protection.

The Launchpad gives access to all programs stored on your U3 drive.



Many applications are ready to be installed on your U3 drive.



COSTING LITTLE MORE THAN STANDARD USB DRIVES, U3 DRIVES CAN ALSO BE USED JUST LIKE ANY OTHER USB

left-hand side. Click this to launch the program and you'll be able to use it just as though it were installed on your hard drive. When you close OpenOffice, it'll delete any traces that might be left there — handy for privacy. If you install and use a web browser, you won't leave cache or history files on the PC.

Switch back to the U3 Software Central window, browse for more programs you might use, and add as many as you need.

SAVE DISK SPACE

U3 extensions are accessible from the Launchpad itself. If AutoPlay isn't working for the U3 drive on your PC, click Status and Settings > U3 Launchpad Settings > Install the Launcher. This adds a program to your system which runs in the background and automatically starts the Launchpad as soon as you plug it in — usually much faster than Windows can manage.

If you use your U3 drive to hold confidential information, Launchpad makes it easy to ensure no-one else can access it. Just click Status and

Settings > Security > Enable, and password protection will be turned on the next time you insert your drive. (Don't just unplug the drive though, U3 drives are sensitive about that — always use the Launchpad Eject button.)

Click Launchpad's Manage Launchpad's Programs link for more useful options, including the ability to start a given application as soon as you insert the drive. And you can also remove the Welcome application to get rid of the initial tutorial and save yourself a few MB disk space.

If your drive is short on capacity, you can save more space on individual applications. To do this with OpenOffice, find the file `openoffice_org_for_u3.u3p` and copy it to your hard drive. This is a ZIP file, so rename it to have a ZIP extension and extract its content into a folder. Open it, browse to the Device folder, then look for files you might be able to do without. If you're familiar with the program, do you need the Help folder? Deleting that alone will save you 20MB, useful given the limited capacity of a U3 drive. Keep the original file at hand for easy restoration

later. For now, though, Zip up the tweaked version, rename it to have a `u3p` extension again, and copy it back onto your U3 drive, overwriting the original there. Try launching the application again to test it.

ADD MORE APPLICATIONS

Explore U3 and you'll be impressed. You'll want to install some of your favourite programs, but not all of them will be available in U3 format — at least, not yet.

If the program relies on installed components running elsewhere on the hard drive, it may not work on a U3. Programs that use background processes or Windows services aren't going to like being started or stopped.

Software not specifically designed for U3 won't clear up after themselves, a potential privacy issue if you use several PCs.

Try building the `u3p` package manually. Follow the instructions online at Elite News (www.elitenews.org/2006/05/installing-programs-on-u3-smart-drive.html). You can't beat PackageFactory for U3 (www.eure.ca), a free (non-commercial) tool that creates `u3p` packages in just a couple of clicks. You now have a U3 office packed with all your favourite programs and ready to run wherever you encounter a Windows 2000, XP or Vista PC. **ETC**

SPOTLIGHT ON...

U3: THE SECURITY IMPLICATIONS

USB drives that automatically launch software are a convenience but could also represent a potential security risk. IT consultancy Sharp Ideas (www.sharp-ideas.net) illustrated one danger last year when it created Slurp.exe 2.0, a tool that could copy thousands of documents to its U3 host in just a couple of minutes. And if all the hacker needs to do is plug a drive into your PC, it's very difficult for you to spot. If you only have a few systems at home

then you probably don't have to worry, but on business or public networks it's a different story. There's a new class of programs that gets much closer, allowing you to control which users can access what devices on the ports of your choice. DeviceLock (www.device-lock.com) is reasonably priced, while GFI EndPointSecurity (www.gfi.com) and DeviceWall (www.device-wall.com) are good choices for larger networks.

HANDY TIP

If U3 isn't for you, it's not difficult to remove the Launchpad software, essentially leaving you with a regular USB flash drive. Just check your manufacturer's web site for an uninstall tool (SanDisk have one at www.sandisk.com/Assets/u3/launchpadremoval.exe, for instance), or download the generic uninstaller from the main U3 site (www.u3.com/uninstall/default.aspx) to remove the software.



apc downtime

HIGH-PERFORMANCE PLAYTIME

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Candy Grabber

Boy, this is top-shelf. Next to the peltier-cooled mini-fridge, this has to be one of the best geek office toys we've laid eyes on — and we know what we're talking about, too, because we've got one of these in the APC office(!). Stick a coin in the slot and control the robotic arm — grabbing the candy is harder than it seems. Its old-school brilliance nearly made us throw out our beta disc of *Quake Wars* — only for a minute though. Could be great for the kids too — builds up their coordination for video games.

CONTACT dstore.com.au
ONLINE www.dstore.com.au
PRICE \$49.95
VERDICT ★★★★★



LG FM37

It's an MP3 player, but it's got a touchscreen, which means you'll soon be seeing it on prime time. Carrying this player tells fellow gadget lovers you're an aficionado, and that you appreciate a fine user interface the way a cigar lover savours the flavour of a Cuban. Your fingers will glide over the GUI, like Tom Cruise operating his futuristic crime-solving computer in *Minority Report*. (Except you're pressing play to 'Onion Skin', and Boom Crash Opera probably won't be in the charts in the year 2054.)

CONTACT LG
ONLINE <http://au.lge.com>
PRICE \$299 (4GB)
VERDICT ★★★★★



Prodikeys

One second you're typing in Word, the next you're pogoing while bashing out the beep beep beep to Silverchair's *Young Modern*. It's geek music heaven, and it happens when keyboards and midi keyboards are melded together into a solid chunk of plastic. Also, it comes in black or beige. What's great about this stuff is you can emulate a piano, flutes, drums, even a guitar. Great for home recording, learning piano, or possibly making sound effects for your film project. We're getting the band back together!

CONTACT Creative
ONLINE www.prodikeys.com
PRICE \$89.95
VERDICT ★★★★★



Wireless Internet Radio

You can really come across like a wizened old-timer and say you're listening to 'the wireless' with this internet radio — it's an 802.11g networked radio. Turn it on and connect to one of the thousands of net radio stations online. It supports WMA, MP3 and Real Audio, plus there's an alarm clock. The upside: now you can tune into the drone metal station you always wanted. The downside: all you have to worry about is your wireless network being online, and your net connection staying up.

CONTACT Grundig
ONLINE www.grundig.net.au
PRICE \$399
VERDICT ★★★★★

apc
UBER

Super cool

apc
1337

Very cool

apc
7001

Incool



Car PC S63

When it comes to in-car music, some people are happy with a tape player, while others go for a Core 2 Duo PC with SATA drive support and full networking capabilities. It's called the 'Car PC', though Pioneer Computers says it's suitable for trucks and even semi-industrial use. The finned black box is noiseless, which is handy, though there's not much point if it's in a lowered Falcon XR8. We wonder if back-seat installation should be mandatory, lest the temptation to play a few games overwhelms you in traffic jams.

Just iBand

We don't know for sure exactly why this is, but stick an 'i' in front of any gadget, and suddenly we want it. Take the Just iBand — it makes no sense, but for some inexplicable reason we still want to play songs on it as soon as possible. The iBand has a dock connector, remote control and onboard control panel, and works with a range of iPods. Weirdly, the slogan for this Apple-white desktop unit is "The Sound You Can See". Actually, you can't. Still, this should give you a few minutes of fun.

Audio 350 Halo 2 Edition

Here at Downtime HQ we're all for pretending we're actually inside the games we play (instead of just tapping away at a mouse). Which is why we nod approvingly at this set of headphones with the green Halo colour scheme — like the Master Chief support team would wear if they wore Halo-branded 'phones. Features super-soft, swivel-mounted ear 'cushions' and a noise-cancelling boom mike to cut out background clamour (so epic moments in battle aren't ruined by people yelling at you to take out the garbage).

SIXAXIS Wireless Controller

Some people find it easy to use a console game controller — others find themselves bending and twisting their arms out in front of them. If you're in the latter category, you might like this wireless controller, which has a built-in motion sensor to detect when the player tilts, thrusts or pulls. It allows "gameplay to become a natural extension of the player's body." The games have to be made to use this feature, so fingers crossed we get more than glorified versions of Duck Hunt.

.. CONTACT Pioneer Computers
.. ONLINE www.pioneercomputers.com.au
.. PRICE \$1,399
.. VERDICT ★★★★★

.. CONTACT Protac
.. ONLINE www.protac.com.au
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.. VERDICT ★★★★★



Motorstorm

1337

Troy Coleman gets a head-rush from his PS3's fumes.

Remember watching the pants-wetting pre-rendered 'this is in-game' footage Sony released seemingly an age ago? Finally with the launch of the PS3 we get to see if it was all just a cunning ruse.

Think Dakar rally, atop a desert tower. Race though the most improbable terrain possible. Scrap corrugated metals and splintered timber from what should be structurally unsound bridges between a series of mesas, and between the mesa maze messes is mud and dirt. And more mud.

Motorbikes, ATVs, off-road beetles and heavily armoured trucks

are all on the menu and ready for destruction. Split into 21 entry 'tickets' to race competitions, with between two and four races in each ticket. No one way is the 'right' way to go on a course. Multiple paths can be taken dependent on the vehicle chosen.

Not for the casual racer, the AI competition is unrelenting. A nitrous boost is available when you need some space between you and the pack. The problem is, however, that boosting is so unstable that using it too much will result in your machine exploding. Take it to the limit and just when you think you're leading the pack, the resonant heat from



another racer can send your temps over the top.

Exploding or crashing your vehicle leads to a gratuitous slow-motion cut animation of just how badly you would die if it were real life. Is that really how we would rag-doll down a cliff if we rode over on a bike? In-game graphics are absolutely

incredible to say the least. Lighting is perfect and the level of detail, even as the scenery motion blurs by is awesome. Get stuck in the race pack and mud splashes onto the screen, hindering viewing. After a short time, vehicles go from clean and unblemished to mud-caked and extremely damaged.

CONTACT Sce
ONLINE www.motorstorm.com
PRICE \$99.95

PLATFORM PS3

Competitive AI, incredible graphics

AI = super hard

VERDICT ★★★★★



Sam and Max: Bright Side of the Moon

1337

Richard Cobbett questions whether it's six times the charm in Sam and Max's episodic sequels.

Love or hate the results, you have to applaud Telltale for being the first episodic game developer to actually follow through. Seven months, six adventure games. The series had its ups and downs, but it's been a fun ride — the lovable Freelance Police spreading their trademark brand of chaos and confusion to TV, the Mafia, American politics, the internet and even the moon.

The catch is that this speed led to an over-reliance on a basic template; one that gets old quickly if you sit down to play through all six

games in a row. Each offers new characters and new locations, but not very many of either — rehashing the same basic puzzles and comedy material in the duo's neighbourhood, and often hiding puzzle solutions in the tiny bit that's changed for this one-off instalment. Every time, the duo's neighbour Sybil has a new job — usually fine, she was fun and got a lot of the best lines — and every time you have to endure their other neighbour Bosco's latest ghastly, unfunny comedy accent to buy some overpriced pile of junk.

Of the six episodes, by far the best are the second and fourth, featuring Sam and Max taking part in a series of TV parodies and raising hell in the White House respectively. This one also features a superb song-and-dance number, and a great story twist. If they'd all been like this one, it would have been a great series; instead, it's merely good.

It's clear that the designers were learning as they went along, and you can follow in their steps with the rapid improvement of the scripts, the extra depth to the

backgrounds and the sheer mass of stuff on offer. We're definitely looking forward to series two, and if you didn't buy into this one, it might be worth holding back to see the games played as they were intended.

However, while fun, funny, and yes, even furry, taken as one whole, there's no getting away from the fact that this season never even approaches the level of its predecessor, the stunning Sam and Max Hit The Road. A tall order, no question, but when you shoot for the top, you can't let the sky be your limit.

CONTACT Telltale Games
ONLINE www.telltalegames.com
PRICE US\$8.85 download

Designers improve look with each episode.

Episode templates don't vary greatly.

VERDICT ★★★★★



Command & Conquer 3: Tiberium Wars

Nick Race engrosses himself in the battle of NOD vs GDI vs what?



Prince of Persia. Leisure Suit Larry. Quake. These are game series that have grown up with the modern PC industry.

The games come out intermittently, but when they do, they're a thing to behold. Command & Conquer sits with those franchises as one of the most played and most enjoyed PC game series ever. And it's time for a new one.

Command & Conquer 3: Tiberium Wars continues after C&C: Tiberium Sun, about 15 years after a monumental battle between the Global Defense Initiative (GDI) — the 'good guys' out to save the earth from The Brotherhood of Nod's evil tiberium-spreading ways. This episode begins with the destruction of the GDI's upper echelon in a surprise nuke attack on a space station, beginning a shoring up of defenses, and an attack into Nod's heartlands for the GDI troops.

Down the line, Nod's detonation of a liquid tiberium (the mysterious self-replicating, deadly but useful mineral) bomb summon the Scrin

— the alien farmers who sowed the seeds of tiberium on earth. They aren't a happy bunch. Nod and GDI play very similarly to older generations of the game, with GDI's heavy firepower and extensive troops balanced with Nod's cheap but effective guerilla tactics. The Scrin mixes it up a little, adding a faction with strong air superiority and a devastating Mothership, which delivers a whopping from on high.

The game is back looking outstanding, using a very buffed and polished SAGE engine (previously seen in the Battle for Middle Earth games) for some outstanding effects. Now, it's not all roses and candy in C&C3. Though it's updated and polished, it doesn't feel new at all. In the wrong light, you'd be forgiven thinking it was Tiberium Sun, and the Scrin really don't add much or make much impression.

As RTSs go, C&C 3: Tiberium Wars feels old school. It feels like playing (and paying for) more of the same. It's a good thing the pedigree is top notch.

CONTACT EA
ONLINE www.commandandconquer.com
PRICE \$99.95

✓ More C&C action

✗ Just more C&C action

VERDICT ★★★★★



Chili Con Carnage 1337

Troy Coleman serves revenge with an ice-cold cerveza and a tequila shot.

A spin-off to the action-packed Total Overdose: A Gunslinger's Tale in Mexico, Chili Con Carnage (CCC) sees Ramiro Cruz, aided by the unpredictable, and sozzled uncle Marco, blaze into the seedy drug-fuelled underworld of Los Toros, Mexico, to avenge his father's murder-by-harvester.

Fundamentally, CCC is a point A-to-B platform game, but the ability to move laterally throughout means targets can easily spring from any angle. With the camera fixed over the shoulder, this means

that, at times, especially after a series of jumps or special moves, it can be tough to know which way Ram is facing.

Two fists and the usual array of handguns, automatics, shotguns, rocket launchers and grenades are at Ram's disposal along the way, but Molotov cocktails are by far the most fun weapons.

When Ram jumps in an area with baddies nearby, it will trigger a bullet-time slow-motion-style sequence. In this time it is possible to target and take off multiple

baddies without taking a hit yourself. Wall flips and multiple spins mid-flight add to the spice. It is easy to get used to the ease of time-shift kills and all too often we found ourselves slowing time to enter new areas or when rounding a corner.

A series of special 'loco' moves can be performed if in serious trouble or... whenever you feel like it really. Our favourite, the El Mariachi, let's Ram unleash hell with two fully loaded guitar cases. Another to look out for is the Tornado: a spinning jump with Uzis



firing in opposite directions.

Boss fights are definitely what sets CCC apart. Without giving too much away, let's just say there's plenty of exploding chickens (can there ever be enough?) and more than enough pseudo-bull charging henchman to dispatch.

CONTACT Atari
ONLINE www.chiliconcarnagegame.com
PRICE \$79.95
PLATFORM PSP

✓ Loco moves, bosses

✗ Fixed camera

VERDICT ★★★★★





chip chat



by Peter Dockrill

THE MOD SQUAD

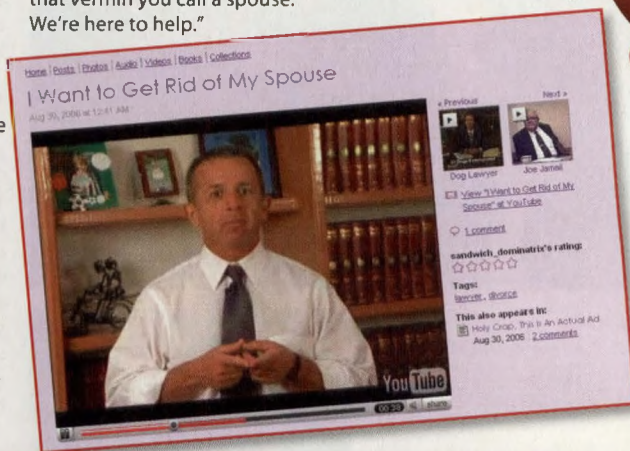
Ultratables: this story's got nothing to do with 'em. Nope, instead, what we've got here is an Xbox 360 which has been transformed into a laptop PC. (Not that you'd really want to rest this behemoth on your lap.) As revealed by its creator on benheck.com ('The official site of Benjamin J Heckendorn'), the regal-sounding 'Xbox 360 Laptop the Second' is, fittingly enough, Heckendorn's sophomore attempt at converting the 360 into a mobile computer (and "Uses 60% Less Aluminum!" than its predecessor). But, the really cool part is that Heckendorn is posting technical specs plus how-to guides and diagrams (and videos about the project) on www.engadget.com, so, if you fancy following in his crazy footsteps, there's nothing to dissuade you. If, however, you're not so technically inclined, you may wish to settle for simply enjoying the photos and "[imagining] yourself playing the 360 by the pool surrounded by supermodels."



Fools rush in ...

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science fiction

Hmm. Now this one's interesting. As reported at tech and culture site www.kuro5hin.org, the US Department of Homeland Security has "designated the 1982 film *TRON* as 'sensitive' and ordered Walt Disney Studios to turn over all copies of the film in its possession. Retailers are also receiving notices to remove all copies of the film from stock shelves and turn them over to Federal officials. The reports have industry insiders bewildered and outraged." Okay, okay, so *TRON* as a movie may suffer its share of flaws (no discernible plot, over-reliance on special effects, villain called 'Sark' etc.), but what it *does* have is groundbreaking CGI and *lightcycles*. Surely it shouldn't be condemned to this fate?

According to Kuro5hin, the logic behind the decree is that portions of the movie's real-world scenes were filmed on location at the Shiva nuclear fusion research facility. Although the facility was dismantled in

1981, in the current global political climate and "as a government-funded nuclear research program, [Shiva] is subject to comprehensive national security guidelines, and it is this point that seems to have gotten the film into trouble. . . the [Shiva] scenes [contain] sensitive nuclear information."

Now, what to make of all this? Could Uncle Sam really be pulling such a stunt? If so, what's next for other sci-fi classics. . . A moratorium on *The Matrix*? A quarantine of *The Quiet Earth*? A total recall of. . . uh. . . *Total Recall*? Well, maybe not. Apart from the fact that it's unlikely many other films were shot in such 'sensitive' locales, one or two other tidbits in Kuro5hin's report don't quite add up. . . The original post appeared on 29 March in the Fiction section of the site. . . But, the real killer (if you read close): the FBI spokesperson quoted in the piece goes by the name of Agent *Lirpa Sloof*. . . **ABC**

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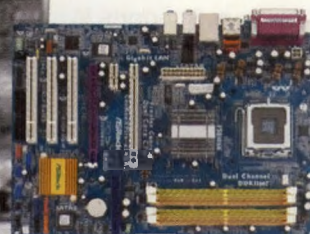
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- Supports MP1/2 MP@ML, MP4 ASP@L5, DivX 3.11, 4.x and 5.x, 6.x
- Supports Dolby digital, MP1 and MP2 Layers I, II and III (MP3), WMA
- Supports stereo L/R, optical/coaxial digital audio, analogue 5.1 channels
- Supports DVI, composite, s-video optical (audio) and component video outputs, 11g wireless connection and 10/100 ethernet port.
- USB 2.0 host port; USB storage devices can be attached and the stored content can be played directly. (ie external HDD)
- USB 2.0 slave port; provides an alternative way to download digital content from your PC directly.
- Wirelessly stream media from other PCs
- 3.5" HDD is not included

ALT-MG35

- DMA with a 10/100 Ethernet port
- Features NDAS networking technology (no more complicated network setups).
- Supports MP1/2 MP@ML, MP4 ASP@L5, DivX 3.11, 4.x and 5.x, 6.x, JPEG, MPEG, DAT, Xvid, OGG
- Supports Dolby digital, MP1 and MP2 Layers I, II and III (MP3), WMA
- Supports High Resolution Video Output up to 1080i progressive scan.
- Supports Digital 5.1 Channel Audio Output (DTS, AC3).
- Connects to PC via USB 2.0 for a fast data transfer or across a home network for file sharing from multiple PC's.
- 3.5" HDD is not included



ALT-MG25

- Supports DivX, MPEG-4, DAT, Xvid, MP3, OGG, WMA and JPEG
- Supports USB 2.0 slave port
- Supports MP1/2 MP@ML, MP4 ASP@L5, DivX 3.11, 4.x and 5.x, 6.x, JPEG
- Supports composite, S-video, component video outputs
- Supports Dolby digital, MP1 and MP2 Layers I, II and III (MP3), WMA
- Supports stereo L/R, optical/coaxial digital audio, analogue 5.1 channels
- 2.5" HDD is not included



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TELEPHONE LINE SOLUTIONS

Save Money, Improve Efficiency Or Add A Professional Touch To Your Line

TELEPHONE CALL RECORDING FOR ANY APPLICATION

UPDATED LINE CONNECT model

CRU2 is designed to connect direct to ANY telephone extension, to provide High Quality telephone call recording to your PC (PC software provided) or other recording device. Provides automatic operation with start/stop capability from any telephone.



NEW HANDSET CONNECT model

CRU3 is designed to connect to any PABX, COMMANDER, PSTN or VOIP handset. Will then provide High Quality telephone call recording to your PC (PC software provided). Automatic operation with start/stop activation from your PC.



NEW PROFESSIONAL model

CRU4 provides all facilities of the CRU2 Model (it connects to any handset) and in addition allows message(s), or previous recordings to be played back to the other party at any time. Allows notes to be tagged to the recording file.



NEW AUTO DIGITAL ANNOUNCEMENT

Our AUTOMATIC ANNOUNCEMENT DEVICE will ANSWER your incoming telephone calls, play an announcement and then resume ringing of your telephones. Ideal for announcing change of number or that the call will be recorded.



TELEPHONE LINE DOOR STATION SOLUTIONS

UPDATED DOOR STATION UNIT

DS2 will RING all of your telephones when a visitor arrives at your front door or gate. Answer to communicate. Open the door or gate with touch tones. Operates on any ordinary single line or multi-line phone system. Requires surface mount or flush mount door phone.



NEW PABX DOOR STATION UNIT

DS4 is designed to be connected to an analogue extension of any PABX, Commander or other multi line telephone system. DS4 goes "off hook" when activated by the door phone. Requires surface mount or flush mount door phone.



NEW DOOR STATION DIAL OUT

Our New DS6 model will RING your telephones and then DIAL OUT to a pre-programmed telephone number if a visitor arrives and you are not home. Requires Surface Mount or Flush Mount Door Phone. Can also connect to a PABX extension.



NEW DOOR PHONES

Range of door phones are available



SHARE YOUR LINES AND SAVE INSTALLATION & RENTAL CHARGE

NEW FAXSTREAM DUET SWITCHES

Will allow any Fax or Modem device to operate with the Telstra FaxStream Duet service. Provides fully automatic fax reception, just like having a separate line. Two models are available.



NEW INTELLIGENT FAXSWITCH

FAX SWITCH will allow your existing Fax Device to connect to any Single Telephone line or a Multi Line (PABX) phone system, to provide for FULLY AUTOMATIC Fax operation. Will operate with all existing telephones and also an Answering machine.



NEW INTELLIGENT MODEMSWITCH

MODEM SWITCH allows your existing Data Modem Device to connect to any Single Telephone Line, Fax Line or a Multi Line (PABX) phone system, to provide for FULLY AUTOMATIC Dial In & Dial Out Modem Data operation. Models available that allow up to 8 devices on 1 line.



NEW EFTPOS SWITCH

EFTPOS switch will allow your existing EFTPOS device to share any existing Single Telephone Line, Fax Line or a Multi Line (PABX) phone system. Provides automatic connection on dialing BARGE-IN protection prevents interference when line is in use. Alternative model will allow operation on 2 lines.



MISCELLANEOUS TELEPHONE LINE APPLICATIONS

NEW VOIP SELECTOR

This device will allow you to connect one or more telephones to your TELEPHONE LINE and VOIP LINE. Incoming calls from either line ring on the connected telephone(s). Outgoing calls are automatically DEFAULTED to ONE LINE, but the alternative line can be selected by DTMF code.



UPDATED TWO LINE SELECTOR

Premium device will allow you to connect one Telephone Device to two Telephone lines (Telstra, Optus, VOIP, PABX etc). Ideal for EFTPOS, Cordless Phones, Modems etc. Additional features are provided, including automatic (or manual) selection of an alternative line if the default line is busy.



TELEPHONE CALL TRANSFER

Easy-Transfer will allow you to answer a call on one telephone and then TRANSFER the call to another telephone fitted to the same line. Also provides INTERCOM facility. Uses your existing telephones.



MULTIPLE NUMBER SWITCH

Operate Two numbers on one line. This device will connect your Multiple number calls to one set of phones or answering machine and your Normal number calls to another set of phones or answering machine.



TELEPHONE LINE ON HOLD SOLUTIONS

UPDATED DIGITAL ON HOLD

DMS, Australia's Leading On Hold player, is an MP3 based Message On Hold Device, designed to provide the High Quality and High Reliability that is necessary for all telephone On Hold applications. Easy message change provided by replacing memory card.



NEW ELECTRONIC MESSAGE UPDATE

DMC is available with range of optional Automatic electronic message update methods including Email, Modem, FTP and Network IP. We have a National Network of Dealers ready to produce your customized message.



SINGLE LINE ON HOLD

Just plug our MOH Line Sharer into any socket on your single telephone line, connect any audio source (Radio, PC or DMC) and you now have a professional telephone line On Hold facility for your existing telephones.



NEW AUTOMATIC CALL ATTENDANT

Our single line CALL ATTENDANT will answer your incoming calls after 4, 6 or 8 rings, play a greeting & then put your call on hold until you are able to answer. Also provides Message on Hold facility for your single line.



MISCELLANEOUS TELEPHONE LINE APPLICATIONS

TELEPHONE LINE SIMULATOR

This TELEPHONE LINE SIMULATOR can be used for testing, programming & demonstration of analogue telecommunications equipment, without the need to use a telephone line and generating costly calls. 4 Models are available.



NEW RING INDICATOR

This device detects incoming calls and will close/open a relay to match the cadence of the incoming ring. Can also be set to close a relay until a call is answered. Ideal for control of external horns or lights to advise of an incoming telephone call.



REMOTE TELEPHONE ACTIVATOR

Call in to Switch ON, Switch OFF or RESET your PC, SERVER or any electrical equipment by telephone line using touch tone commands. RTA connects to any telephone line. Requires PCU accessory. 3 models are available.



POWER CONTROL UNIT

PCU connects direct to the RTA and also to your power socket to allow telephone line dial in switching of the 240V supply connected to your equipment. Easy Plug In User Installation. Controls up to 10 Amps.



DIGITAL AUDIO EQUIPMENT

NEW MESSAGE ON DEMAND

TDS can be programmed with up to 256 MP3 based messages stored on an MMC/SD card, which can be recalled and played by keypad entry or time programmed sequences.



TALKING DISPLAY UNIT

TDU will play 1 or more pre-recorded messages as soon it is triggered by a movement sensor, a switch, or at a preset time interval. Ideal for Product Promotions, Product Information, Message Warnings etc.



MULTIPLE INPUT UNIT

MIU will allow for up to 12 separate movement sensors or switches to be connected to the TDU. Each sensor triggers its own unique message, output via any 8 ohm unpowered, powered or amplified speaker.



AUDIO SWITCHING UNIT

ASU will allow the TDU to be connected to any existing PA or Background Music system. The existing PA or Background Music system is then muted or faded whenever a TDU message is broadcast and then reconnected when finished.



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TP-Link 108M Wireless
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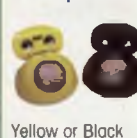
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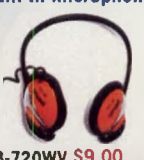
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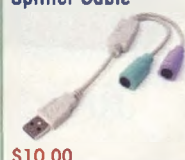
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Model	Genuine	TONNY
BCI-24BK	\$14.00	\$5.60
BCI-24C	\$33.00	\$7.20

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Model	Genuine	TONNY
BX-3	\$49.00	\$28.00
BC-02	\$39.00	\$28.00
BC-03	\$38.00	\$28.00
BC-05	\$50.00	\$30.00
BC-20	\$49.00	\$28.00
BCI-3eBK	\$25.00	\$ 8.80

Model	Genuine	TONNY
BCI-3eC/M/Y	\$19.00	\$6.40
BCI-6BK	\$24.00	\$6.40
BCI-6C/M/Y	\$24.00	\$6.40
BCI-6G	\$24.00	\$6.40
BCI-6R	\$24.00	\$6.40
BCI-6PC/PM	\$24.00	\$6.40

Model	Genuine	TONNY
BCI-15BK	\$24.00	\$6.40
BCI-15C	\$44.00	\$7.20
BCI-16C	\$44.00	\$7.20
BCI-21BK	\$13.00	\$4.90
BCI-21C	\$28.00	\$6.40

NEW! Canon Models

Model	Genuine	TONNY
PGI-5BK	\$22.50	\$8.50
CLI-8BK	\$22.50	\$8.50
CLI-8C/M/Y	\$22.50	\$8.50
CLI-8PC	\$22.50	\$8.50
CLI-8PM	\$22.50	\$8.50

Epson Ink Cartridges

Model	TONNY
T001	\$18.90
T003	\$ 9.90
T005	\$18.00
T007	\$ 9.30
T008	\$13.00
T009	\$15.00
T013	\$ 4.50
T014	\$ 7.90
T017	\$ 9.70
T018	\$10.60
T026	\$ 9.70
T027	\$12.40
T028	\$ 9.70
T029	\$10.60
T038	\$ 9.60

Model	TONNY
T039	\$10.60
T0321	\$10.80
T0322	\$ 7.50
T0323	\$ 7.50
T0324	\$ 7.50
T0422C/M/Y	\$ 9.50
T0461	\$ 8.90
T0472/3/4	\$ 8.90
T0491/2/3	\$ 8.90
T0494/5/6	\$ 8.90
T0540/1/2	\$ 8.90
T0541/2/3/4	\$ 8.90
T0547/8/9	\$ 8.90
T0561/2/3/4	\$ 8.90
T5591/2/3	\$ 8.90

HP Ink Cartridges

Model	Genuine	TONNY
51625A (#25)	\$46.00	\$28.00
51626A (#26)	\$46.00	\$28.00
51629A (#29)	\$46.00	\$28.00
51633MA (#33)	\$41.00	\$32.00
51645A (#45)	\$46.00	\$16.00
51649A (#49)	\$48.00	\$28.00
C1823D (#23)	\$51.00	\$30.00
C4841/2/3/4AA (#10)	\$46.00	\$14.00
C4836/7/8A (#11)	\$48.00	\$14.00
C5010DA (#14)	\$47.00	\$26.00
C5011DA (#14)	\$35.00	\$24.00
C6578D (#78)	\$51.00	\$30.00
C6614A (#20)	\$44.00	\$24.00
C6615DA (#15)	\$44.00	\$24.00

Model	Genuine	TONNY
C6625A (#17)	\$48.00	\$30.00
C6656AA (#56)	\$32.00	\$18.00
C6657AA (#57)	\$51.00	\$32.00
C6658AA (#58)	\$37.00	\$26.00
C8727A (#27)	\$31.00	\$24.00
C8728AA (#28)	\$35.00	\$26.00
C8765WA (#94)	\$31.00	\$27.00
C8767WA (#96)	\$42.00	\$29.00
C9363WA (#97)	\$45.00	\$32.00
C8721WA (#02)	\$28.00	\$11.00
C8771/2/3WA (#02)	\$16.00	\$10.00
C8774/5WA (#02)	\$16.00	\$10.00
C9351AA (#21)	\$24.00	\$21.00
C9352AA (#22)	\$27.00	\$23.00

Brother Ink Cartridges

Model	Genuine	TONNY
LC-21BK	\$30.00	\$7.90
LC-21C/M/Y	\$17.00	\$7.50
LC-02BK	\$21.00	\$7.90
LC-02C/M/Y	\$11.00	\$7.50
LC-04BK	\$28.00	\$7.90
LC-04C/M/Y	\$16.00	\$7.50
LC-47BK	\$32.00	\$7.90
LC-47C/M/Y	\$18.50	\$7.50



Lexmark Ink Cartridges

Model	Genuine	TONNY
12A1970	\$48.00	\$32.00
12A1980	\$56.00	\$35.00
17G0050	\$46.00	\$32.00
17G0060	\$53.00	\$35.00
13400HC	\$53.00	\$36.00
13619HC	\$52.00	\$38.00
10N0217	\$33.00	--
10N0227	\$35.00	--

Model	Genuine	TONNY
10N0016 (#16)	\$46.00	\$36.00
10N0026 (#26)	\$49.00	\$39.00
15M0120 (#20)	\$53.00	\$41.00
18C0031 (#31)	\$43.00	\$35.00
18C0034 (#34)	\$43.00	\$35.00
18C0035 (#35)	\$45.00	\$37.00
18L0032 (#82)	\$47.00	\$39.00
18L0042 (#83)	\$53.00	\$41.00

Samsung Ink Cartridges

Model	Genuine	TONNY
M40	\$59.00	\$23.00

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HP Black Toner Cartridges

Model	Genuine	TONNY
92298A	\$139.00	\$ 65.00
C3906A/F	\$ 95.00	\$ 49.00
C3903A	\$120.00	\$ 59.00
C3909A	\$220.00	\$ 95.00
C4092A	\$ 87.00	\$ 49.00
C4096A	\$135.00	\$ 65.00
C4127A	\$145.00	\$ 65.00
C4127X	\$169.00	\$ 80.00
C4129X	\$210.00	\$ 95.00
C4182X	\$239.00	\$135.00
C7115A	\$ 89.00	\$ 49.00
C7115X	\$115.00	\$ 65.00

Model	Genuine	TONNY
C8061X	\$165.00	\$ 85.00
Q1338A	\$189.00	\$ 95.00
Q2612A	\$ 95.00	\$ 59.00
Q2613A	\$ 95.00	\$ 59.00
Q2613X	\$125.00	\$ 69.00
Q2610A	\$155.00	\$ 75.00
Q2624A	\$ 96.00	\$ 59.00
Q5942A	\$190.00	\$ 95.00
Q5942X	\$279.00	\$125.00
Q5949A	\$ 99.00	\$ 59.00
Q5949X	\$169.00	\$ 75.00
Q6511A	\$169.00	\$105.00

TONNY Colour Toner Cartridges

Printer Model	Model	Genuine	TONNY
HP LJ1500/2500, Canon LBP2410	C9700A (BK)	\$115.00	\$ 65.00
	C9701/2/3A (CYM)	\$135.00	\$ 79.00
HP LJ4600	C9720A (BK)	\$199.00	\$155.00
	C9721/2/3A (CYM)	\$262.00	\$185.00
HP LJ4500, Canon LBP2460/2040	C4191A (BK)	\$119.00	\$ 59.00
	C4192/3/4A (CMY)	\$165.00	\$ 69.00
HP LJ8000	C4149A (BK)	\$150.00	\$ 89.00
	C4150/1/2A (CMY)	\$225.00	\$155.00
Epson C900/1900	S050100 (BK)	\$ 99.00	\$ 79.00
	S050097/98/99 (CMY)	\$210.00	\$119.00
Epson C1000/C2000	S050033 (BK)	\$119.00	\$ 90.00
	S050034/5/6(CMY)	\$249.00	\$119.00

Samsung Toner

Model	Genuine	TONNY
ML-1210D3	\$ 94.00	\$ 59.00
ML 1650D8	\$185.00	\$105.00
ML-1710D3	\$ 98.00	\$ 59.00
ML-2010	\$103.00	\$ 59.00
ML-2150D8	\$185.00	\$140.00
ML-4100D3	\$ 99.00	\$ 83.00
ML-4500D3	\$119.00	\$ 73.00
ML-6060D6	\$155.00	\$ 93.00
SCX-4216D3	\$ 99.00	\$ 59.00
SCX-5312D6	\$ 95.00	\$ 79.00
SCX-D4200A	\$105.00	\$ 69.00
SF-5100D3	\$ 89.00	\$ 59.00

Brother Toner Cartridges

Model	Genuine	TONNY
TN-100	\$ 29.00	\$23.00
TN-200	\$ 42.00	\$23.00
TN-2025	\$ 74.00	\$59.00
TN-300	\$ 42.00	\$23.00
TN-3060	\$125.00	\$65.00
TN-8000	\$ 43.00	\$23.00
TN-6600	\$ 99.00	\$65.00
TN-7600	\$125.00	\$65.00

Canon Toner Cartridges

Model	Genuine	TONNY
E-31	\$189.00	\$85.00
EP-22	\$ 99.00	\$49.00
EP-25	\$ 99.00	\$49.00
EP-26	\$109.00	\$69.00
EP-32	\$145.00	\$65.00
EP-52	\$185.00	\$80.00
FX-3	\$132.00	\$59.00
CART-303	\$ 83.00	\$59.00
CART-N	\$220.00	\$76.00
CART-U	\$ 99.00	\$69.00
CART-W	\$147.00	\$55.00

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Model	Genuine	TONNY
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EPL-5900	\$205.00	\$49.00
EPL-6200	\$215.00	\$49.00

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Model	Genuine	TONNY
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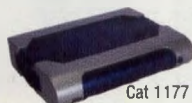
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Memory	512MB PC5300 DDRII RAM	512MB PC5300 Kingston DDRII	512MB PC5300 Kingston DDRII	512MB PC5300 DDRII RAM	512MB PC5300 Kingston DDRII	1GB Kingston 5300 ECC DDRII
Hard Drive	80GB Seagate SATAII HD	160GB Seagate SATAII HD	250GB Seagate SATAII HD	160GB WD SATAII HD	250GB Seagate SATAII HD	2 x 320GB Seagate SATAII HD
Optical Drive	Liteon 18X Dual Layer DVD-RW	Liteon 18X Dual Layer DVD-RW	LG H42NBB 18X DVD-RW	LG H42NBB 18X DVD-RW	Pioneer SATA 18X DVD-RW	Pioneer 18X Dual DVD-RW
Graphics	128MB Gigabyte 7100GS PCI E	128MB Gigabyte 7100GS PCI E	128MB Gigabyte 7300GS PCI E	128MB Asus X550 PCI E	256MB Asus 7600GS PCI E	Integrated ATI ES1000
Sound	Integrated Realtek ALC883	Integrated Realtek ALC883	Integrated Realtek ALC883	Integrated Realtek ALC660	Integrated Realtek ALC660	
LAN	Integrated Gigabit Ethernet	Integrated Gigabit Ethernet	Integrated Gigabit Ethernet	Integrated Gigabit Ethernet	Integrated Gigabit Ethernet	Integrated Dual Gigabit Lan
Modem						Dual-Channel SATA Controller
Floppy	1.44 Panasonic	1.44 Panasonic	1.44 Panasonic	1.44 Panasonic	1.44 Panasonic	1.44 Panasonic
Case	USB in front case 400W PSU	USB in front case 400W PSU	USB in front case 400W PSU	USB in front case 400W PSU	USB in front case 400W PSU	Intel SC5298DP 550W PFC

CPL Value Budget PC

CPU	AMD AM2 3800 \$699 DualCore 4200 \$739 DualCore 4800 \$769	Intel Celeron 2.8G \$649 Pentium4 3.0G(631) \$689 DualCore 3.0G(925) \$729
Motherboard	Asus M2N-MX Motherboard	Gigabyte VM900M Motherboard
Memory	512MB PC5300 DDRII RAM	512MB PC5300 DDRII RAM
Hard Drive	80GB WD 7200 HDD	80GB WD 7200 HDD
Optical Drive	Liteon 18X Dual Layer DVD-RW	Liteon 18X Dual Layer DVD-RW
Graphics	Integrated	Integrated
Sound	Integrated AC97 6 Channel	Integrated AC97 6 Channel
Floppy	1.44 Panasonic	1.44 Panasonic
Case	USB in front case 400W PSU	USB in front case 400W PSU
Monitor	17" Acer 1716S LCD	17" Acer 1716S LCD
Keyboard	Logitech Deluxe 250 Keyboard	Logitech Deluxe 250 Keyboard
Mouse	Logitech Optical Mouse	Logitech Optical Mouse
Speaker	Logitech R10 Speaker	Logitech R10 Speaker

CPL Entertainment PC

CPU	DualCore 3800 \$949 DualCore 4600 \$999 DualCore 5200 \$1079	DualCore 3.2G(935) \$999 Intel Core2 Duo 4400 \$1059 Intel Core2 Duo 6420 \$1139
Motherboard	Gigabyte M55 SLI-S4 Motherboard	Asus P5LD2 SE Motherboard
Memory	512MB PC5300 Kingston DDRII	512MB PC5300 Kingston DDRII RAM
Hard Drive	160GB WD SATAII HDD	160GB Seagate SATAII HDD
Optical Drive	LG H42NBBK 18X Dual DVD-RW	LG H42NBBK 18X Dual DVD-RW
Graphics	256MB Gigabyte 7600GS TD PCIE	256MB Asus 7600GS TD PCIE
Sound	Integrated 8 Channel	Integrated 8 Channel
Floppy	1.44 Panasonic	1.44 Panasonic
Case	Coolermaster Elite 331 Case	Coolermaster Elite 330 Case
Monitor	17" Viewsonic VA703B LCD	17" Viewsonic VA703B LCD
Keyboard	Logitech Internet 350 Keyboard	Logitech Internet 350 Keyboard
Mouse	Logitech Optical Mouse	Logitech Optical Mouse
Speaker	Logitech X230 Subwoofer	Logitech X230 Subwoofer

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CPU	AMD AM2 3800 \$779 DualCore 4200 \$819 DualCore 4800 \$849	Pentium4 3.0G(631) \$769 DualCore 3.2G(935) \$819 Core2 Duo E4400 \$879
Motherboard	Asus M2N Motherboard	Gigabyte 945PL-S3 Motherboard
Memory	512MB PC5300 Kingston DDRII	512MB PC5300 Kingston DDRII RAM
Hard Drive	80GB WD SATAII HDD	80GB Seagate SATAII HDD
Optical Drive	Liteon 18X Dual DVD-RW	Liteon 18X Dual DVD-RW
Graphics	128MB Asus X550 TD PCIE	128MB Gigabyte 7100GS TD PCIE
Sound	Integrated, Gigabit Lan	Integrated, Gigabit Lan
Floppy	1.44 Panasonic	1.44 Panasonic
Case	USB in front case 400W PSU	USB in front case 400W PSU
Monitor	17" Viewsonic VA703M LCD	17" Viewsonic VA703M LCD
Keyboard	Microsoft Business Keyboard	Microsoft Business Keyboard
Mouse	Microsoft Optical Mouse	Microsoft Optical Mouse

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CPU	AM2 DualCore4200 \$1279 AM2 DualCore5600 \$1399	Intel Core2 Duo 6600 \$1459 Intel Core2 Duo 6700 \$1599
Motherboard	Gigabyte M57 SLI-S4 Motherboard	Asus P5B Motherboard
Memory	1GB PC5300 Kingston DDRII RAM	1GB PC5300 Kingston DDRII RAM
Hard Drive	250GB Seagate SATAII HDD	250GB Seagate SATAII HDD
Optical Drive	Pioneer 212D SATA 18X DVD-RW	Pioneer 212D SATA 18X DVD-RW
Graphics	256MB Asus 7900GS TD PCI E	256MB Asus 7900GS TD PCI E
Sound	Integrated 8 Channel	Integrated 8 Channel
Floppy	1.44 Panasonic	1.44 Panasonic
Case	Coolermaster Centurion 532 Case	Coolermaster Centurion V Case
Monitor	17" Samsung 740N LCD	17" Samsung 740N LCD
Keyboard	Microsoft Multimedia Keyboard	Logitech Media Keyboard
Mouse	Microsoft Optical Mouse	Logitech Optical Mouse
Speaker	Logitech X530 5.1 Speaker	Logitech X530 5.1 Speaker

Intel Core2 PC \$1289

CPU	Intel Core2 Duo E6320
Motherboard	Asus P5LD2 SE MB
Memory	1GB PC5300 Kingston DDRII
Hard Drive	320GB Seagate SATAII HDD
Optical Drive	Pioneer SATA 18X DVD-RW
Graphics	256MB Asus 7900GS TD
Sound	Integrated 8 Channel
LAN	Integrated Gigabit
Modem	
Floppy	1.44 Panasonic
Case	Coolermaster Elite330
Monitor	19" Viewsonic VA1912W
Keyboard	Microsoft Wireless 2000
Mouse	Microsoft Optical Mouse

Family Value PC \$699

CPU	Intel Pentium4 3.0G 631
Motherboard	Gigabyte VM900M MB
Memory	512MB PC5300 DDRII RAM
Hard Drive	80GB Seagate SATAII HDD
Optical Drive	Liteon 18X Dual DVD-RW
Graphics	Integrated
Sound	Integrated 6 Channel
LAN	Integrated Gigabit
Speaker	Logitech R10
Floppy	1.44 Panasonic
Case	USB in front case 400W PSU
Monitor	17" Philips 170S7FB LCD
Keyboard	Microsoft Business Hardware
Mouse	Microsoft Optical Mouse

DualCore Performance \$769

CPU	Intel DualCore 3.0G 925
Motherboard	Gigabyte 945GMF-DS2
Memory	512MB PC5300 Kingston
Hard Drive	80GB Seagate SATAII HDD
Optical Drive	LG 18X Dual Layer DVD-RW
Graphics	Integrated Intel GMA950
Sound	Integrated 8 Channel
LAN	Integrated Gigabit
Speaker	Altec Lansing 120i
Floppy	1.44 Panasonic
Case	USB in front case 400W PSU
Monitor	17" Viewsonic VA703B
Keyboard	Microsoft Business Hardware
Mouse	Microsoft Optical Mouse



- All system configurations can be altered. Check upgrade solution in weekly Green Guide
- We also build customised PC.
- All parts subject to stock availability.
- Product may vary from picture shown.
- System warranty: one year parts & two years labour return to base.



	ASUS	ASUS	ASUS	ASUS	ASUS
Model	A8JS-4S019C	F3F-AP138C	F3JP-AP002C	F3JR-AP028C	F3JV-AK001P
CPU	Core2 Duo T7200 2.0G	Core2 Duo T2250 1.6G	Core2 Duo T5500 1.6G	Core2 Duo T7200 2.0G	Core2 Duo T7200 2.0G
MEMORY/Max.	2x512MB DDRII667 / 2G	512MB DDRII667 / 2G	2x512MB DDRII667 / 2G	2x1GB DDRII667 / 2G	2x512MB DDRII667 / 2G
VIDEO	512MB NVidia Go7700	Intel 945GM Express	256MB Radeon X1700	128MB ATI X2300	512MB GeForce 7600
HARD DRIVE	120GB SATA	80GB 5400rpm	80GB SATA 5400rpm	120GB SATA 5400rpm	120GB SATA 5400rpm
OPTICAL DRIVE	DVD Super Multi Drive	DVD Super Multi Drive	DVD Super Multi Drive	DVD Super Multi Drive	DVD Super Multi Drive
DISPLAY	14" WXGA ColourShine	15.4" WXGA ColourShine	15.4" WXGA ColourShine	15.4" WXGA ColourShine	15" WSXGA Colourshine
MODEM	0.3MP Digital Camera	1.3MP Camera	Card Reader, Camera	Reader, 1.3MP Camera	0.3MP Digital Camera
NETWORKING	10/100/1000 Lan / Wireless 802.11g, Bluetooth	10/100/1000 Lan/ Wireless 802.11g, Bluetooth	10/100/1000 Lan/ Wireless 802.11g, Bluetooth, 1394	10/100 Ethernet/ Wireless 802.11g, Bluetooth	10/100 Ethernet/ Wireless 802.11g, Bluetooth
OPERATION SYSTEM	Vista Home Premium 32	Vista Home Premium 32	Vista Home Premium 32	Vista Home Premium 32	Windows XP Pro
WEIGHT	2.4KG	2.95KG	2.9KG	2.9KG	2.9KG
DIMENSION(HXWxD)	34.8-37.3x335x245mm	28-40.5x365x269.5mm	40.5x365x269.5mm	40.5x365x269.5mm	40.5x365x269.5mm
PRICE	\$2259	\$1299	\$1599	\$1899	\$2139

	ASUS	ASUS	ASUS	ASUS	hp
Model	F5R-AP034C	G1-AK029G	G2P-7R011G	R1F-K033E	NX7300RR585AV
CPU	Duo Core T2060 1.6G	Core2 Duo T7200 2.0G	Core2 Duo T7200 2.0G	Core2 Duo T7200 2.0G	Core2 Duo T5500 1.6G
MEMORY/Max.	512MB DDRII667 / 2G	2x1GB DDRII667 / 2GB	2x1GB DDRII667 / 2GB	2x512MB DDRII667 / 2G	512MB DDRII667 / 4G
VIDEO	128MB ATI X200	512MB NVidia Go7700	512MB ATI X1700	128MB Intel® 945GM	128MB Intel GMA950
HARD DRIVE	80GB 5400rpm	120GB 5400rpm	120GB 5400rpm	120GB SATA 5400rpm	120GB 5400rpm
STORAGE	DVD Super Multi Drive	DVD Super Multi Drive	DVD Super Multi Drive	DVD Super Multi Drive	DVD-RW Dual Layer
DISPLAY	15.4" WXGA	15" WSXGA	17" WXGA ColourShine	13.3" WXGA ColourShine	15.4" WXGA
MODEM	1.3MP Camera	Reader, 1.3MP Camera	Reader, 1.3MP Camera	Build in Card Reader	
NETWORKING	10/100/1000 Lan/ Wireless 802.11g, Bluetooth	10/100/1000 Lan/ Wireless 802.11g, Bluetooth	10/100/1000 Lan/ Wireless 802.11g, Bluetooth	10/100/1000 Lan/ Wireless 802.11g, Bluetooth	10/100/1000 Lan/ Wireless 802.11g, Bluetooth
OPERATION SYSTEM	Vista Home Premium 32	Vista Ultimate	Vista Ultimate	Vista Business	Vista Business
WEIGHT	2.65KG (6-Cell)	3.1KG (8-Cell)	4.4KG (8-Cell)	2.0KG (3-cell)	2.75KG
DIMENSION(HXWxD)	27-35x365x262mm	37.4x324x284mm	46.6x315.6x410.6mm	35x317x232mm	30.3x328.6x266.7mm
PRICE	\$1299	\$2599	\$3099	\$3059	\$1539

	acer	TOSHIBA	TOSHIBA	TOSHIBA	lenovo
Model	TM 4202AWLMi	A120 0R903H	A120 0QP01X	A8 0HU041	9456-DRM
CPU	Core Duo T2250 1.7G	Core Duo T2300 1.6G	Core Duo T5500 1.6G	Core 2 Duo T5600 1.8G	Dual Core T5500 1.6G
MEMORY	512MB DDRII533 / 4GB	512MB DDRII667 / 4GB	512MB DDRII667 / 4GB	1GB DDRII533 / 4GB	512MB DDRII667 / 2GB
VIDEO	224MB Intel GMA950	128MB Intel GMA 950	128MB Intel GMA 950	128MB Intel GMA 950	128MB Intel GMA950
HARD DRIVE	80GB SATA 5400rpm	60GB SATA 5400rpm	80GB SATA 5400rpm	80GB SATA 5400rpm	80GB SATA 5400rpm
STORAGE	DVD SuperMulti Dual	DVD SuperMulti Dual	DVD SuperMulti Dual	DVD SuperMulti Dual	DVD Rewritable Drive
DISPLAY	15" WXGA	15" WXGA	15" WXGA	15" XGA	15" XGA
MODEM	5-in-1 Card Reader	56K Modem	56K Modem	56K Modem	56K Modem
NETWORKING	10/100 Ethernet/ Wireless 802.11b/g	10/100/1000 Ethernet/ Wireless 802.11b/g	10/100/1000 Ethernet/ Wireless 802.11b/g	10/100/1000 Ethernet/ Wireless 802.11b/g	Gigabit Ethernet/ Wireless 802.11g, Bluetooth
OPERATION SYSTEM	Vista Home Basic	Vista Home Basic	Vista Business	Vista Business	Windows XP Pro
WEIGHT	2.89KG	2.9KG	2.9KG	2.9KG	2.88KG
DIMENSION(HXWxD)	29.3-36x358x269mm	29.8-36.9x368x268mm	29.8-36.9x368x268mm	29.8-36.9x368x268mm	40.2x332x269mm
PRICE	\$1139	\$1099	\$1459	\$1999	\$1499

ASUS A8V-VM

- Supports AMD Socket 939 Athlon 64/FX Athlon 64 X2/Athlon 64
- VIA K8M800 + VT8251 Chipset
- Front Side Bus 1600 MT/s
- Dual-channel DDR400/333/266, Max. 4GB
- 4x SATA II (RAID0, RAID1, RAID0+1)
- Graphic, Sound, Lan onboard
- 8x USB 2.0 Ports



\$89

ASUS M2N/ M2N-1394

- Support: AMD Socket AM2 Athlon 64 X2/Athlon 64 FX/Athlon 64/Sempron CPU
- FSB Support: 2000/1600 MT/s
- Chipset: NVIDIA nForce® 430 MCP
- Dual-channel DDRII 800/667/533, Max. 8GB
- 1 * PCI-E x 16, 2 * PCI-E x 1, 3 x PCI 2.2
- 4x SATA 3.0Gb/s
- RAID 0, 1, 0+1, 5
- Gigabit Lan



\$109/129

ASUS M2N-MX

- Support: AMD Socket AM2 Athlon 64 X2/Athlon 64 FX/Athlon 64/Sempron CPU
- FSB Support: 2000/1600 MT/s
- Chipset: NVIDIA nForce430/GeForce6100
- Dual-channel DDRII 800/667/533, Max. 4GB
- Graphics: Integrated GeForce 6100 GPU
- 4 x SATA 3Gb/s with RAID 0, 1, 0+1, 5



\$99

ASUS M2N-SLI Deluxe

- Support: AMD Socket AM2 Athlon 64 X2/Athlon 64 FX/Athlon 64/Sempron
- FSB Support: 2000/1600 MT/s
- Chipset: NVIDIA nForce® 570 SLI™ MCP
- Dual-channel DDRII 800/667/533, Max. 8GB
- 2x PCI Express x16 Support NVIDIA SLI
- 6 x SATA 3.0Gb/s, RAID 0, 1, 0+1, 5
- 8 Channel HD Audio
- Gigabit Lan
- 1394 & 10 x USB2



\$199

ASUS M2N32-SLI Deluxe WIFI

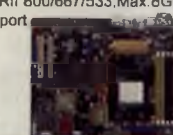
- Support: AMD Socket AM2 Athlon 64 X2/Athlon 64 FX/Athlon 64/Sempron
- FSB Support: 2000/1600 MT/s
- Chipset: NVIDIA nForce® 590 SLI™ MCP
- Dual-channel DDRII 800/667/533, Max. 8GB
- 2*PCI-E x16, support NVIDIA SLI™
- Dual Gigabit LAN
- 1394 & 8xUSB2



\$289

ASUS M2N32-SLI Premium Vista

- Support: AMD Socket AM2 Athlon 64 X2/Athlon 64 FX/Athlon 64/Sempron
- FSB Support: 2000/1600 MT/s
- Chipset: NVIDIA nForce® 590 SLI™ MCP
- Dual-channel DDRII 800/667/533, Max. 8GB
- 2*PCI-E x16, support NVIDIA SLI™
- Dual Gigabit LAN
- 1394 & 8xUSB2



\$359

ASUS M2N4-SLI

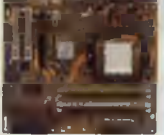
- Support: AMD Socket AM2 Athlon 64 X2/Athlon 64 FX/Athlon 64/Sempron
- FSB Support: 2000/1600 MT/s
- Chipset: NVIDIA nForce® 64 SLI™ MCP
- Dual-channel DDRII 800/667/533, Max. 8GB
- 2*PCI-E x16, support NVIDIA SLI™
- Gigabit LAN
- 10xUSB2



\$139

ASUS M2NPV-VM

- Supports AMD Socket AM2 Athlon 64 X2 / Athlon 64 FX / Athlon 64 / Sempron
- Dual-channel DDR2 800/667/533
- PCI Express architecture
- Integrated GeForce6 GPU
- Dual VGA Output: DVI-D & RGB
- HDTV out interface
- 2 x 1394a Support
- Gigabit LAN
- SATA 3Gb/s, RAID 0, 1, 0+1, 5



\$119

ASUS M2V

- Supports AMD Socket AM2 Athlon 64 X2/Athlon 64 FX/Athlon 64/Sempron
- FSB Support: 2000/1600 MT/s
- Chipset: K8T890
- DDR2 800/667/533, Max. 8GB
- 1x PCI Express x16 slot
- 6 Channel HD Audio
- Gigabit Lan
- 8 USB2 Ports



\$99

ASUS M2A-VM

- Supports Socket AM2 for AMD Athlon™ 64 X2/ Athlon™ 64/ Sempron™
- FSB Support: 2000/1600 MT/s
- Chipset: AMD 690G
- DDR2 800/667/533, 4 Slots, Max. 8GB
- Integrated 256MB ATI Radeon X1250
- 1x PCI Express x16
- 6 Channel HD Audio
- Gigabit Lan
- 8 USB2 Ports



\$129

ASUS Commando

- Intel® Quad-Core CPU ready
- Intel® Core2 Extreme/ Core2 Duo Ready
- Intel P965 chipsets
- Dual-channel DDR2 800/667/533, Max. 8GB
- Extreme Tweaker
- SupremeFX / DTS Connect / Noise Filter
- LCD Poster
- Onboard Switches



\$309

ASUS Striker Extreme

- Intel® Quad-core CPU Ready
- Intel® Core™2 Extreme/ Duo Ready
- NVIDIA nForce® 680i SLI™
- Dual-channel DDR2 800/667/533
- SupremeFX / DTS Connect / Array Mic / Noise Filter
- Extreme Tweaker
- LCD Poster
- Onboard LED
- Onboard Switches



\$489

ASUS P5B

- Support Intel LGA775 Core™2 Extreme / Core™2 Duo / Extreme / Pentium® D CPU
- Chipset: Intel® P965
- FSB 1066/800/ 533 MHz
- Dual-channel DDR2 800/667/533, 8GB
- PCI Express 16
- 6x SATA 3Gb/s
- PCI-E Gb LAN
- 8-channel HD Audio



\$159

ASUS P5B Deluxe/ WiFi

- Support Intel LGA775 Core™2 Extreme / Core™2 Duo / Extreme / Pentium® D CPU
- Chipset: Intel® P965
- FSB 1066/800/ 533 MHz
- Dual-channel DDR2 800/667/533, 8GB
- PCI Express 16
- 6x SATA 3Gb/s
- Dual Gigabit LAN
- 8 Phase Power
- Fanless Design without or w/ WiFi



\$259/289

ASUS P5B-E

- Support Intel® Core™2 Extreme/ Core™2 Duo/ Pentium® Extreme/ D/ P4/ Celeron® D
- Chipset: Intel® P965
- FSB 1066/800/533 MHz
- Dual-channel DDR2 800/667/533, 8GB
- 1 x PCI-E x16, 3 x PCI-E x1, 6 x SATA 3.0 Gb/s ports
- 2xIEEE1394a ports, 10xUSB2
- Gigabit LAN



\$209

ASUS P5B-MX Wifi

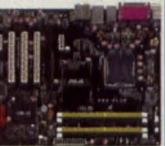
- Intel® Core2 Extreme / Core2 Duo Ready
- Intel® 946GZ + ICH7 chipset
- Dual-channel DDR2 800/667/533, 4GB
- Intel® GMA 3000 integrated
- FSB 1066(O.C.) 800/533MHz
- Dual Channel DDR2 667/533
- PCI Express x16
- 6 Channel HD Audio, Gigabit Lan
- ASUS WiFi-AP Solo



\$129

ASUS P5B-Plus Vista

- Intel® Core2 Quad/Extreme/Core™2 Duo
- Intel® Pentium® Extreme / Pentium® D / Pentium® 4 / Celeron® D Ready
- Dual-channel DDR2 800/667/533
- AI Remote/ AP Trigger/ ASAP/ TPM
- All High-quality Conductive Polymer Capacitors
- SATA on the Go/ 1394



\$259

ASUS P5B Premium Vista

- Intel® Core™2 Quad/ Extreme/ Duo ready
- Dual-channel DDR2 800/ 667/ 533
- ScreenDUO/ AI Remote/ AP Trigger
- 8 Phase Power Design
- Heat-pipe Design & Stack Cool 2
- Crystal Sound
- All High-quality Conductive Polymer Capacitors



\$349

ASUS P5B-V

- Support Intel® Core™2 Extreme/ Core™2 Duo/ Pentium® Extreme/ D/ P4/ Celeron® D
- Intel® Quad-core CPU Ready
- Chipset: Intel G965
- FSB 1066/800/533 MHz
- Dual-channel DDR2 800/667/533, 8GB
- Intel® GMA X3000 GPU integrated
- Fanless Design
- 2x1394, 10xUSB2
- Gigabit LAN/ 8 Channel HD Audio



\$209

ASUS P5B-VM

- Support Intel® Core™2 Extreme/ Core™2 Duo/ Pentium® Extreme/ D/ P4/ Celeron® D
- Intel® Quad-core CPU Ready
- Chipset: Intel G965
- Dual-channel DDR2 800/667/533, 8GB
- FSB 1066/800/533
- Intel® GMA X3000 GPU integrated
- 2x1394, 10xUSB2
- Gigabit LAN/ 8 Channel HD Audio



\$169

ASUS P5LD2 SE

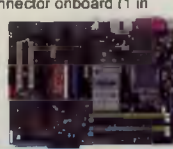
- Support Intel LGA775 Pentium 4 CPU, Dual Core CPU ready
- Intel 945 chipset
- Dual-Channel DDR2 667/533/400, 4GB
- FSB 1066/800/533
- 4 SATA (3Gb/s)
- PCI Express
- Marvell Gbit LAN
- 8 Channel Audio
- 8 USB2 ports



\$129

ASUS P5N-E SLI

- Intel® Quad-Core
- Dual-channel DDR2 800/667/533
- Great performance and overclocking
- ASUS O.C. Profile
- ASUS Fanless Design
- 2 IEEE 1394a connector onboard (1 in back + 1 on board)
- 5 x SATA 3.0 Gb/s (including 1 x SATA On-the-Go)
- ASUS Q-Con-



\$189

ASUS P5N32-E SLI

- Intel® Quad-core CPU Ready
- Intel® Core™2 Extreme/Core™2 Duo
- NVIDIA nForce® 680i SLI™
- NVIDIA Quad-SLI™ Ready
- Dual-channel DDR2 800/667/533
- 1333*/1066/800/533MHz
- SupremeFX/DTS
- Stack Cool2 and Heat-pipe Thermal Solution
- 8 Phase Power Design



\$309

ASUS P5W DH Deluxe

- Support LGA775 Intel Core2 Duo, Core2 Extreme and Multi-Core CPU
- Intel 975X + Intel ICH7R Chipset
- FSB 1066/800MHz
- Dual-channel DDR2 800/667/533, max8GB
- 2 x PCI-E x 16 / 2 x PCI-E x 1 / 3 x PCI
- Support ATI CrossFire graphics
- Dual Gigabit LAN
- ASUS Digital Home features



\$329

GIGABYTE™ 945G-S3

- Support Intel LGA 775 Core™2 Duo & Pentium® D and Pentium 4 CPU
- Intel® 945G Express Chipset
- Dual Channel DDR2 667/533 up to 4GB
- Integrated Graphics & PCI-Express
- HD Audio
- Gigabit Lan
- 10 USB 2.0 ports (6 by cable)
- Virtual Dual BIOS



\$139

GIGABYTE™ 945GMF-DS2

- Support Intel LGA 775 Core™2 Duo & Pentium® 4 CPU
- Intel® 945G Express Chipset
- Dual Channel DDR2 667/533 up to 4GB
- Integrated Graphics & PCI-Express
- 8 Channel HD Audio
- Gigabit Lan & Firewire
- 10 USB 2.0 ports (6 by cable)



\$129

GIGABYTE™ 945GZM-S2

- Support Intel® Core™ 2 Duo* / Pentium® D Processor
- Intel® 945GZ Express Chipset
- Dual Channel DDR2 533/400 up to 2GB
- Integrated Intel GMA 950
- Integrated new generation SATA 3Gb/s interface
- Gigabit LAN
- 8-channel Intel® HD Audio



\$89

GIGABYTE™ 945PL-S3

- Support Intel LGA 775 Core™2 Duo & Pentium® D and Pentium 4 CPU
- Intel® 945PL Express Chipset
- Dual Channel DDR2 533/400 up to 2GB
- PCI-Express x16
- Realtek ALC883 Audio
- 8 USB 2.0 ports (4 by cable)
- Virtual Dual BIOS



\$99

GIGABYTE™ 945P-DS3

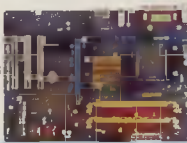
- Support Intel LGA 775 Core™2 Duo & Pentium® D and Pentium 4 CPU
- Intel® 945P Express Chipset
- Dual Channel DDR2 667/533 up to 4GB
- PCI-Express x16
- Realtek ALC883 Audio
- Gigabit Lan
- 8 USB 2.0 ports (4 by cable)
- Virtual Dual BIOS



\$119

GIGABYTE™ 965G-DS3

- Support Intel LGA 775 Core™2 Duo & Pentium® D and Pentium 4 CPU
- Intel® G965 Express Chipset
- Dual Channel DDR2 800/667/533, 8GB
- Integrated Intel GMA X3000 & PCI-Express
- 8-Channel Intel High Definition Audio
- SATA 3Gb/s interface
- Gigabit Lan
- 9 USB 2.0 ports (6 by cable)



\$199

GIGABYTE™ 965G-DS4

- Supports Intel® Core™2 Extreme Quad-Core / Core™2 Duo processor
- All-Solid capacitor motherboard design
- Supports Dual Channel DDR2 800 memory
- Integrated Intel GMA X3000
- 8-channel Intel HD Audio
- Extensive heat pipe and thermal pads design
- Supports Vista Premium



\$259

GIGABYTE™ 965GM-DS2

- Support Intel® Core™ 2 Extreme/ Intel Core™ 2 Duo processor
- Intel® G965 Express Chipset
- Dual Channel DDR2 667/533 up to 8GB
- Integrated Intel GMA X3000 Graphics & PCI-Express
- HD Audio
- Gigabit Lan
- 10 USB 2.0 ports & 3 x IEEE 1394



\$169

GIGABYTE™ 965P-DS3P

- Supports Intel® Core™ 2 Extreme / Core™2 Duo processor
- Intel® P965 Express Chipset
- Dual Channel DDR2 800/667/533, 8GB
- Features PCI-E graphics interface
- SATA 3Gb/s
- Intel HD 8 Channels Audio
- Gigabit LAN & Firewire
- 10 x USB2 Ports



\$189

GIGABYTE™ 965P-DS4

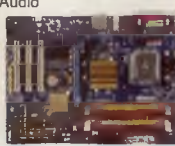
- Supports Intel® Core™2 Extreme / Core™2 Duo processor
- Intel® P965 Express Chipset
- Dual Channel DDR2 800/667/533, 8GB
- Features PCI-E graphics interface
- SATA 3Gb/s, RAID 0, 1, 5, 10
- Intel HD 8 Channels Audio
- Gigabit LAN & IEEE 1394



\$259

GIGABYTE™ 965P-S3

- Support Intel LGA 775 Core™2 Duo & Pentium® D and Pentium 4 CPU
- Intel® 965P Express Chipset
- Dual Channel DDR2 800/667/533, 8GB
- PCI-Express x16
- Realtek ALC883 Audio
- Gigabit Lan
- 10 USB 2.0 ports (4 by cable)
- Virtual Dual BIOS



\$149

GIGABYTE™ 965QM-DS2

- Supports Intel® Core™2 Extreme Quad-Core / Core™2 Duo processor
- Intel® Q965 Express Chipset
- Dual Channel DDR2 800/667/533, 8GB
- Integrated Intel® Graphics GMA 3000
- PCI-Express x16
- Integrated SATA 3Gb/s interface
- Intel® Gigabit LAN



\$199

GIGABYTE™ N650SLI-DS4

- Supports Intel Core2 Quad / Duo CPU
- NVIDIA nForce 650i SLI Chipset
- Supports 1333/1066/800 MHz FSB
- Dual Channel DDR2 800 up to 8GB
- Dual PCI-E x16 interface
- Integrated SATA 3Gb/s with RAID
- 8-Channel High Definition audio
- Gigabit Lan and IEEE1394



\$229

GIGABYTE™ N680SLI-DQ6

- Supports Intel Core2 Quad / Duo CPU
- NVIDIA nForce 680i SLI MCP Chipset
- Supports 1333/1066/800 MHz FSB
- Dual Channel DDR2 800 up to 8GB
- Ultimate graphics with 3 PCI-E x16
- Integrated SATA 3Gb/s with RAID
- 8-Channel High Definition audio
- Gigabit Lan and IEEE1394



\$459

GIGABYTE™ VM900M

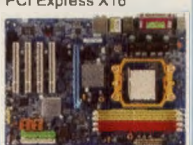
- Supports Intel® Core™2 Duo/Pentium® D/Pentium® 4 Processor
- Supports high efficiency DDR2 667 RAM
- PCI Express x16 graphics interface
- Integrated Chrome9 HC™ IGP Graphic Engine
- 8 channel High-Definition Audio
- Supports Windows Vista Basic



\$89

GIGABYTE™ M55Plus-S3G

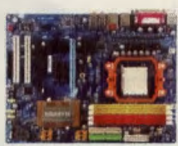
- Support: Socket AM2 for AMD Athlon™ 64 FX / Athlon™ 64 X2 Dual-Core / Athlon™ 64 / Sempron™
- nVIDIA® GeForce 6100 Chipset
- Dual channel DDR2 800/667/533, 4 slots
- Integrated VGA, PCI Express X16
- NVIDIA SATA 3Gb/s and RAID 0,1,0+1,5
- Gigabit Lan



\$109

GIGABYTE™ M55SLI-S4

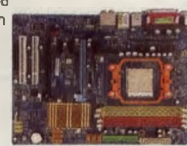
- Support: Socket AM2 for AMD Athlon™ 64 FX / Athlon™ 64 X2 Dual-Core / Athlon™ 64 / Sempron™
- NVIDIA nForce4 SLI Chipset
- Dual channel DDR2 800/667/533, 4 slots, Max. 16MB
- PCI Express X16
- SATA 3Gb/s with RAID function
- Gigabit Lan



\$109

GIGABYTE™ M57SLI-S4

- Support: AMD Athlon™64 X2/ Athlon™64 socket AM2 platform
- NVIDIA nForce 570-SLI Chipset
- Dual channel DDR2 800/667/533, 4 slots, Max. 16MB
- PCI Express X16
- SATA 3Gb/s with RAID function
- Gigabit Lan



\$159

GIGABYTE™ M61P-S3

- AMD Athlon™64 X2 / Athlon™64 Socket AM2 platform
- Supports Dual-Channel DDR2 800 memory
- Integrated NVIDIA® CineFX 3.0 Graphics
- NVIDIA® SATA 3Gb/s with RAID function
- Gigabit LAN and IEEE1394
- 8 channel High Definition Audio
- Supports Windows Vista Premium



\$109

GIGABYTE™ M61PM-S2

- Support: AM2 Athlon™ 64 FX/ Athlon™ 64 X2 Dual-Core / Athlon™ 64 / Sempron™
- NVIDIA® GeForce 6100 Chipset
- FSB: 2000MHz
- Dual Channel DDR2 800/667/533, Max. 16GB
- Integrated VGA & PCI Express
- Gigabit Lan & 1394
- 10 USB 2.0 ports (4 by cable)



\$99

GIGABYTE™ M59SLI-S4

- Support: Socket AM2 AMD Athlon™ 64 FX / Athlon™ 64 X2 Dual-Core/Sempron™ CPU
- nVIDIA® nForce 590 SLI Chipset
- Dual Channel DDR2 800/667, 16GB
- Integrated NVIDIA SATA 3Gb/s with RAID
- SATA 3Gb/s & RAID
- Gigabit LAN
- IEEE1394
- 8-channel High Definition Audio



\$219

intel S5000VSA4DIMM

- Intel Server motherboard
- Support: 1 or 2 Xeon Dual Core 5XXX
- Chipset: Intel S5000V
- 16GB DDR2 533/667 MHz Buffered ECC FB DIMMs (4 DIMMs)
- ATI ES1000 video (16MB)
- 2 x Intel® Gigabit Lan
- Dual-channel SATA, RAID 0,1
- 6 x 3.0Gb/s SATA



\$489

intel S5000VSASATA

- Intel Server motherboard
- Support: 1 or 2 Intel Xeon Dual Core 5XXX
- Chipset: Intel S5000V
- 32GB DDR2 533/667 MHz Buffered ECC FB DIMMs (8)
- ATI ES1000 video (16Mb)
- 2 x Intel® Gigabit Lan
- Dual-channel SATA, RAID 0,1



\$529

intel S5000VSASAS

- Intel Server motherboard
- Support: 1 or 2 Intel Xeon Dual Core 5XXX
- Chipset: Intel Chipset 5000V
- 16GB DDR2 Buffered ECC FB DIMMs (8)
- ATI ES1000 video 16MB
- 2 x Intel® Gigabit Lan
- 4-port SAS
- Dual-channel SATA, RAID 0,1,10



\$699

CPU

Intel Celeron Processor

Celeron 2.8 / 3.0 / 3.3G 775 \$59/69/89

Intel Pentium 4 Processor

Pentium4 3.0G 631 / 3.2G 641 \$99/109

Dual Core 3.0G D925 / 3.2G D935 \$119/139

Core2 Duo E4300 / E4400 \$169/199

Core2 Duo E6320 / E6420 \$229/259

Core2 Duo E6600 / E6700 \$309/439

Core2 Quad Q6600 / QX6700 \$739/1419

Xeon 5110 / 5120 / 5130 \$349/409/519



AMD Processor

AMD Sempron 2800 / 3000 754 \$49/59

AMD Athlon64 3200 / 3500 / 3700 939 \$89/109/129

AMD AM2 3200 / 3800 939 \$79/99

AM2 Athlon 64 Dual Core X2 3600 / 3800 \$99/109

AM2 Athlon 64 Dual Core X2 4200 / 4600 \$139/159

AM2 Athlon 64 Dual Core X2 4800 / 5200 \$179/239

AM2 Athlon 64 Dual Core X2 5600 / 6000 \$259/339

AMD AM2 FX71 / FX74 \$449/599

AMD DualCore Opteron 265/270/275 \$279/339/399



RAM

DDR RAM

256MB PC2100 / 2700 Kingston \$45/45

256MB PC3200 Kingston / Generic \$39/35

512MB PC2100 / 2700 Kingston \$75/75

512MB PC3200 Generic / Hynix \$49/55

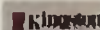
512MB PC3200 Kingston / Corsair \$59/65

1GB PC2100 / 2700 Kingston \$149/149

1GB PC3200 Kingston Single Stick \$129

1GB PC3200 Kingston (2x512MB) \$119

2GB PC3200 Kingston (2x1GB) \$249



DDR II RAM

512MB PC4200 / 5300 DDR2 Generic \$39/39

512MB PC4200 / 5300 DDR2 Kingston \$45/45

512MB PC4200 / 5300 DDR2 Corsair \$45/45

1GB PC4200 / 5300 DDR2 Generic \$69/69

1GB PC4200 / 5300 DDR2 Kingston Single Stick \$79

1GB PC6400 DDR2 Kingston Single Stick \$159

1GB PC4200 / 5300 DDR2 Kingston (2x512MB) \$89

2GB PC5300 DDR2 Kingston Single Stick \$299

2GB PC4200 / 5300 DDR2 Kingston (2x1GB) \$159



2GB PC6400 DDR2 Kingston (2x1GB) \$319

4GB PC5300 DDR2 Kingston (2x2GB) \$599

1GB PC4200 / 5300 DDR2 Corsair Single Stick \$89

1GB PC4200 / 5300 DDR2 Corsair (2x512MB) \$89

1GB PC5400 C4 DDR2 Corsair (2x512MB) \$109

2GB PC4200 / 5300 DDR2 Corsair (2x1GB) \$169

2GB PC5400 C4 DDR2 Corsair (2x1GB) \$219

2GB PC6400 C5 DDR2 Corsair (2x1GB) \$239

2GB PC6400 C4 DDR2 Corsair (2x1GB) \$279

2GB PC6400 C4D DDR2 Corsair (2x1GB) \$339

2GB PC6400 C4 Pro DDR2 Corsair (2x1GB) \$449

2GB PC8500 C5 DDR2 Corsair (2x1GB) \$449

2GB PC8500 C5D DDR2 Corsair (2x1GB) \$469

2GB PC9136 C5D DDR2 Corsair (2x1GB) \$589

2GB PC6400 C3DF DDR2 Corsair (2x1GB) \$629

2GB PC5400 C4 Gold DDR2 OCZ (2x1GB) \$229

2GB PC6400 Gold DDR2 OCZ (2x1GB) \$249

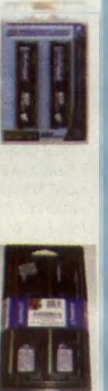
2GB PC6400 Platinum R2 DDR2 OCZ (2x1GB) \$289

2GB PC6400 Platinum EPP DDR2 OCZ (2x1GB) \$319

2GB PC8800 Gold DDR2 OCZ (2x1GB) \$489

2GB PC8500 SLI DDR2 OCZ (2x1GB) \$499

2GB PC9200 FlexXLC DDR2 OCZ (2x1GB) \$599



SD RAM

128MB PC133 \$29

256MB PC100 Double side \$59

256MB PC133 Double side \$59

512MB PC133 Generic \$89

512MB PC133 Hynix \$99



LAPTOP RAM

128MB / 256 MB 133 Hynix \$39/59

256 / 512MB 133 Double Sided \$89/159

256MB PC2100 / 2700 Kingston \$45/45

512MB PC2100 / 2700 Kingston \$79/79

1GB PC2700 DDR Kingston \$159

512MB PC4200 / PC5300 \$49/49

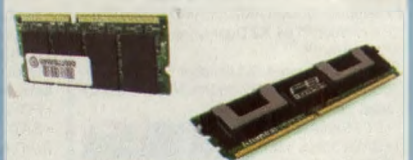
512MB PC4200 / 5300 Kingston \$59/59

1GB PC4200 / 5300 Kingston \$99/99

1GB PC4200 / 5300 Corsair \$99/99

RAM for Server

1GB PC5300 DDR2 Kingston ECC \$229



USB Key Drive

2GB / 4GB USB2 Flash Drive \$29/49

Corsair Voyager 1GB / 2GB / 4GB \$25/45/79

Corsair Voyager 8GB / 16GB \$159/259

Corsair Voyager GT 4GB / 8GB \$99/179

Kingston 1GB / 2GB / 4GB \$19/35/69

Sandisk 1GB / 2GB Cruzer Micro \$25/45

Sandisk 4GB Cruzer Micro \$69

Sandisk 1GB / 2GB Cruzer Titanium \$39/59

Sandisk 4GB Cruzer Titanium \$99

Transcend 1GB / 2GB / 4GB / 8GB \$19/29/59/99



Card Reader

12 in 1 USB2 External Reader \$19

11 in 1 3.5" Int. Reader Beige, Black, Silver \$19

Sandisk 12 in 1 USB2 External Reader \$59

PCMCIA 4 in 1 Card Reader Sandisk \$49

5.25" Reader+USB+1394+Audio \$39

10GB X-Micro Slim USB Storage \$99

Iomega 70GB Rev Drive SATA \$729

Iomega 70GB Rev Drive USB Ext. \$729



Seagate

80GB 2MB / SATAII 8MB	\$59/65
160GB 8MB / SATAII 8MB	\$75/79
250GB 16MB / SATAII 16MB	\$105/105
320GB 16MB / SATAII 16MB	\$125/125
400GB 16MB / SATAII 16MB	\$169/169
500GB 16MB / SATAII 16MB	\$219/229
750GB 16MB / SATAII 16MB	\$389/389



Western Digital

80GB 8MB / SATA 8MB	\$59/59
160GB 8MB / SATAII 8MB	\$75/79
250GB 8MB / SATAII 16MB	\$95/105
320GB 8MB / SATAII 16MB	\$119/125
400GB / 500GB SATAII 16MB	\$159/219
36GB / 74GB 10K SATA 8MB	\$139/209
150GB 10K SATA 8MB	\$309



External Hard Drive

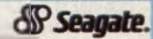


Lacie 160GB 2.5" USB2	\$169
Lacie Porsche 80GB / 120GB 2.5" Combo	\$179/209
Lacie Rugged 80GB / 120GB 2.5" USB2	\$189/229
Lacie Brick 250GB / 320GB 3.5" USB2	\$159/229
Lacie Brick 500GB 3.5" USB2	\$309
Lacie Porsche 250 / 500GB 3.5" USB2	\$159/249
Lacie 250GB / 320GB 3.5" Triple Interface	\$249/289
Lacie 500GB 3.5" Triple Interface	\$399
Lacie 500GB 3.5" Gigabit Ethernet+USB2	\$409



Maxtor 60GB / 100GB 2.5" OneTouch3	\$129/169
Maxtor 120GB / 160GB 2.5" OneTouch3	\$189/209
Maxtor 500GB 3.5" OneTouch3 USB2	\$309
Maxtor 500GB / 750GB 3.5" Touch3 Combo	\$339/559
Maxtor 1TB / 1.5TB 3.5" Touch3 Combo	\$729/999

Maxtor 320GB / 500GB 3.5" Triple Interface	\$279/359
Maxtor 750GB 3.5" Triple Interface	\$589
Maxtor 500GB / 1TB 3.5" Shared Storage	\$549/989



Seagate 120GB / 160GB 2.5" Freeagent Go	\$199/239
Seagate 250GB / 320GB 3.5" Freeagent	\$199/229
Seagate 320GB / 500GB 3.5" Freeagent Pro	\$269/369
Seagate 750GB 3.5" Freeagent Pro	\$559
Seagate 320GB / 500GB 3.5" Mirra PS Server	\$619/739



WD 80GB / 160GB 2.5" Passport Portable	\$139/199
WD 320GB / 500GB 3.5" Mybook Essential	\$199/259
WD 320GB / 500GB 3.5" Mybook Premium	\$239/289
WD 500GB 3.5" Mybook Pro	\$329
WD 1TB 3.5" MyBook Premium EditionII	\$629
WD 1TB 3.5" Mybook World EditionII	\$789



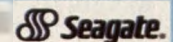
Laptop Hard Drive



Hitachi 80GB / 100GB 5400 8MB	\$99/129
Hitachi 100GB 7200 / SATA	\$179/179
Hitachi 160GB 5400 / SATA	\$199/199
Samsung 40GB / 80GB 5400 8MB	\$69/89
Samsung 120GB / 160GB 5400 8MB	\$129/169



Fujitsu 40 / 80 / 120GB 5400	\$69/89/129
Seagate 80GB 5400 / 7200	\$99/139
Seagate 100GB 5400 / SATA	\$129/129
Seagate 100GB 7200 / SATA	\$169/169
Seagate 120GB 5400 / SATA	\$149/149
Seagate 160GB 5400 / SATA	\$189/189
WD 120GB / 160GB 5400 SATA	\$149/189



SCSI Drive

73/146GB Cheetah 10K Scsi 68pin Seagate	\$279/479	73/146GB Cheetah 15K SAS 68pin Seagate	\$499/899
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Hard Drive Accessories



Nexstar3 USB2 Enclosure

Vantec USB2 Aluminum Casing, transfer rates up to 480Mbps w/ USB2.0, hot-swappable: plug and play without rebooting
Available in blue, black & red color

2.5"/3.5"/5.25"
\$35/55/59



Nexstar3 USB2 & 1394 Enclosure

Vantec USB2 & 1394 Combo Aluminum Casing, transfer rates up to 480Mbps w/ USB2.0, support firewire, hot-swappable: plug and play without rebooting. Available in blue, black & red color

2.5"/3.5"/5.25"
\$55/69/69



Nexstar3 SATA & USB2 Enclosure

Vantec SATA & USB2 Aluminum Casing, transfer rates up to 3Gbps w/ eSATA and 480Mbps w/ USB2.0, hot-swappable: plug and play without rebooting, supports up to 400GB Hard Drives, Available in black color

2.5"/3.5"
\$55/65



Nexstar LS 3.5" Lan Enclosure

Vantec NexStar:LS LAN Share, an Ethernet and USB 2.0 combination IDE HDD enclosure for instant and secure LAN connection with simple driver installation, making it the perfect centralized storage center for small office or home.

\$105



2.5" HDD Enclosure

- Super slim and compact, easy to carry
- Maximum capacity: 80GB
- Dimensions: 127 x 79 x 16mm
- USB2 or USB2 & 1394 Combo Interface

USB2 \$19
Combo \$45



3.5" HDD Enclosure

- Power supply: external power supply
- The maximum support capacity 160GB
- Super slim and easy portability
- Dimensions: 175 x 110 x 33mm
- USB2 or USB2 & 1394 Combo Interface

USB2 \$39
Combo \$55



5.25" HDD Enclosure

- ATA66/100 supported
- Plug-and-play & hot-swappable
- Dimension: 250x155x51 (mm)
- Super slim
- USB2 or USB2 & 1394 Combo Interface

USB2 \$39
Combo \$65



3.5" X-Craft IDE

- Tool-free & Easy Installation
- Fan-less Silent Heat Dissipation
- HDD Shock-proof Mechanism
- Supports All 3.5" PATA or SATA Hard Disk Drives up to 500G
- Attractive Blue LED for power and red LED for HDD Activity

\$49



3.5" X-Craft eSATA

- Tool-free & Easy Installation
- Fan-less Silent Heat Dissipation
- HDD Shock-proof Mechanism
- Supports All 3.5" PATA or eSATA Hard Disk Drives up to 500G
- Attractive Blue LED for power and red LED for HDD Activity

\$59



ViPower Aluminium Mobile Rack VP-410LS2FU

- IDE UDMA 133/100/66
- Compatible with 3.5" IDE devices
- Aluminum
- Two Fans
- Available in Black
- Dimensions: 8.4"(D) x 5.8"(W) x 1.6"(H)

\$40



ViPower SATA Mobile Rack VPP-2010LS2F

- Compatible with Serial ATA 1.0 / 2.0 devices
- Plastic, Hot-Swap, Plug-n-Play
- Two Fans, Lanch switch power switch
- Dimensions: 7.4"(D) x 5.8"(W) x 1.6"(H)

\$35



ViPower SATA Aluminium Mobile Rack VP-5010LSF

- Compatible with Serial ATA 1.0 devices
- True Aluminum
- Hot-Swapable
- Available in Black
- Dimensions: 7.4"(D) x 5.8"(W) x 1.6"(H)

\$55



Notting Hill (Head Office)
7 Howleys Rd., Notting Hill
Tel: (03) 8542 8688
Fax: (03) 9562 8781

West Melbourne Branch
130 Dudley St., West Melbourne
Tel: (03) 9223 4288
Fax: (03) 9328 1899

LG H42NBB DVD-RW

- 18X Super Multi DVD Rewriter
- Compatible with all DVD formats
- Supports Double Layer DVD+R / -R

Available in:
Beige / Black Color

\$49



LG H42LBB Lightscribe

LG GSA-H42LB 18X +/- Dual Layer DVD-RW With Lightscribe

Available in:
Beige / Black Color

\$69



LITEON LH-18A1P DVD-RW

LiteOn 18x Dual Layer DVD-Writer, 18x 8x 8x / 18x 8x 6x / 12x / 16x / + 48x 32x 48x E-IDE, support DVD-RAM, Double Layer DVD+/-R9, SMART-BURN, SMART-X, ABS@ mechanism. Included Nero@ & Power DVD

Available in: Beige / Black

\$49



LITEON LH-18A1H DVD-RW

Lightscribe

- Lightscribe technology to print labels directly to the disk using the same drive
- Burns an image on to one side of the lightscribe disk and record the data on to the other side

\$59



LITEON SHM-165P6SU

External DVD-RW

External 16x 8x / 8x / 16x 6x / 4x / 5x / + 48x 24x 48x E-IDE Super AllWrite, support Double Layer DVD+/-R9, DVD-RAM, SMART-BURN, SMART-X, ABS@ mechanism

\$129



LITEON LH-2B1S

Blue Ray DVD-RW

2x 2x 2x / 12x 4x 8x / 12x 4x 6x / 12x + 32x 24x 32x Serial ATA BD Triple Writer, support BD-R / BD-RE, DVD+/-R DL SMART-BURN mechanism.

\$899



Pioneer 112D IDE

DVD-RW

- 18x maximum recording speed
- Double-layer technology
- OEM drive

Available in:
Beige/Black/ Silver

\$55



Pioneer 212D SATA

Pioneer DVR-212D 18X DVD/CD Writer with SATA interface. 8x +/-Dual Layer, 18x DVD+/-R, 6x DVD-RW/8x DVD+RW, 40x CD-R, 32x CD-RW. Features "Buffer Under Run" protection, "Quiet Drive" firmware utility

Available in:
Beige/Black

\$59



Pioneer A12XLA

Pioneer DVR-A12XLA Retail DVD-RW, 8X / 18X Dual/Single, 12X RAM write, Includes Cyberlink DVD Solutions Software

Available in:
Beige/ Black/ Silver

\$79



Pioneer DVR-K06

Slim Slot DVD-RW

Pioneer DVR-K06 8X8 DVD-RW, Slot Black Color, Dual layer -R & +R. Slimline OEM drive, suitable for compatible notebooks and 12.7mm drive bays.

\$139



Pioneer DVR-K17

Slim Tray DVD-RW

PIONEER DVR-K17 8 x 8 Tray DVD Writer Dual Layer (4x) / RAM write (5x) Slim line

\$109



ASUS 1814BLT SATA

Lightscribe DVD-RW

Asus 1814BLT SATA Lightscribe DVD-RW.

Available in:
Beige / Black Color

\$65



SONY AWG170A10/ AB

- SONY Dual Layer DVD+RW/+R, DVD-RW/-R OEM drive, 18x DVD+/-R, 8x +RW, 8x +R DL 6x -RW, 4x -R DL & 5x DVD-Ram

Available in:
Beige / Black

\$55



SONY DRU830A

DVD-RW

- DVD-Recording speed 18X max.
- Double Layer +R performance to 8X.
- Includes Nero 6.6 SW & Black Face Plate

\$95



SONY DWQ520A10

Slim DVD-RW Black

Sony Black Dual Layer Slim DVD Burner. 8/8/4/18/6/4 (DVD+R/+RW/+R DL/DVD-R/-RW/-R DL).

\$135



SONY DRX830UL Ext.

Dual Layer DVD-RW

- Burn Double Layered DVDs in both +&- formats.
- 8X Double Layer burning
- 18X DVD Recording/play-back
- USB & 1394 interface

\$189



CD Media

Benq 80min CD-R 50pcs spindle	\$15
Shintaro 80min CD-R 50pcs Printable	\$18
TDK 80min CD-R 50pcs spindle	\$19
TDK 80min CD-R 100pcs spindle	\$33



DVD Media

Benq DVD-R / +R 16x 50pcs spindle	\$19
Benq DVD+RW 4x 10pcs	\$12
HP DVD-R / +R 16x 50pcs spindle	\$25
Philips DVD-R / +R 16x 50pcs spindle	\$25
Philips DVD+RW 4x 10pcs	\$12
Ritek DVD-R / +R 8x 50pcs spindle	\$22
Ritek DVD+RW 4x 10pcs	\$12
Shintaro DVD-R / +R 16x 50pcs spindle	\$25
Shintaro DVD+RW 4x 10pcs	\$15
TDK DVD-R 16x 70pcs spindle	\$39
TDK DVD-R / +R 16x 100pcs spindle	\$55
TDK DVD+R Dual Layer	\$5
Verbatim DVD-R / +R 16x 50pcs spindle	\$29

Verbatim DVD-R Dual Layer	\$5
Verbatim DVD+R Lightscribe 30pcs	\$32

Panasonic DVD-RAM 4.7G w/Cartridge	\$7
Panasonic DVD-RAM 9.4G	\$14



Zip Disk

Zip Disk 250MB	\$19
Zip Disk 750MB	\$23

Tablet

WACOM Graphire4 Tablets

Graphire4 gives you the control you need to quickly and easily edit your digital photos. It works great with any software your mouse does and runs on both PCs and Macs. Draw, paint, create artwork for CDs/DVDs, sign your name, and annotate documents in Adobe Acrobat or Microsoft PowerPoint. You can even write directly in Microsoft Office XP and with Apple Inkwell. With both a Wacom pen and mouse you'll have the right tool for any task. Using them alternately reduces repetitive motion. Join more than 2,000,000 satisfied Wacom tablet users and get the control, comfort, and productivity of Graphire today.

(Mouse is not included in the package for both Graphire4 and Intuos3)



Graphire4 4x5: \$119
Graphire4 6x8: \$219

WACOM Intuos3 Tablets

Intuos3 gives you the power to quickly and professionally edit photos and create digital artwork by turning on the full power of Adobe® Photoshop®, Corel® Painter™, and over 100 other leading software applications. Intuos3 tablets now put ExpressKeys™ and Touch Strips right at your fingertips for convenient keyboard shortcuts, scrolling, zooming, brush size control, and more. Wacom's Penabled™ technology gives you the natural feel and superior performance of Wacom's patented cordless and battery-free tablet technology. You'll find that using an Intuos pen, mouse, and tablet gives you more control, comfort, and productivity. Alternating between the comfortable Grip Pen and the ergonomic five-button Intuos3 mouse reduces repetitive motion. It's an easy and natural way to work.

Intuos3 4 x 6: \$289 **6 x 8: \$419**
Intuos3 9x12: \$579 **12x12: \$699**
Intuos3 Wide format 6x11 \$569



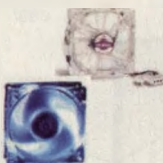
Antec 80mm/92mm/120mm Tricool Case Fan

*Antec (USA) 80, 92 or 120mm Case Fan with LEDs, comes with a 4-pin power connector and a separate signal connector to motherboard.

Available in:
green, blue and red

80/92/120mm

\$25/25/35



ASUS Silent Knight

- All Copper, Ultra Cooling for Dual-Core CPU, CPU Support: Intel® Core™2 Extreme/ Core™2 Duo/ Pentium® D/ Intel® Pentium® 4 HT/ Celeron® D & AMD Athlon™ 64/ X2/ FX (Dual-Core) AMD Athlon™ 64/ Sempron™
- Fan Speed 2,200 rpm ± 10% • Material Cu. Base + Cu. Punched Fins (128 fins) + 6 Heat Pipes

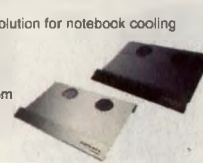
\$69



COOLER MASTER NotePal W1

- World first customized widescreen notebook cooler
- Efficiently reduce the temperature of notebook. Enhance notebook stability and durability
- Ergonomic design offers best in comfort and productivity
- Super silent solution for notebook cooling
- All Aluminum curvy design
- Directly consume power from notebook

\$59



COOLER MASTER Aquagate Mini R120

CoolerMaster Aquagate R120 includes a CPU water block set, radiator, fan, thermal grease, anti-icing fluid, and water tubing. All of the parts come pre-assembled for convenience and ease of use. Comes with universal retention module to suit most current processors.

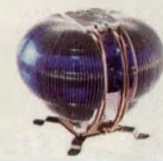
\$119



COOLER MASTER Mars

- Compatibles with AMD Socket AM2 and Intel Core 2 Duo
- Embedded silent fan with shockproof design
- Unique shape design with 2 blue LED light
- Aluminum heat sink with 3 heat pipes and copper base
- Intelligent Fan Speed Controller
- Lead-free Production

\$79



COOLER MASTER Eclipse

- Compatibles with AMD Socket AM2 and Intel 775 CPU
- Aluminum heat sink and copper base with 4 heat pipes
- Gliding fan duct design
- Special turbine fan design
- Intelligent Fan Speed Controller
- Flexible assembling applications
- Lead-free production

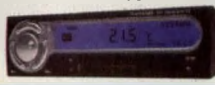
\$89



Thermaltake Hardcano 13

- Ideal solution for integration of a smart card reader and Fan controller into the desktop
- Suit for 5.25" Drive Bay
- The best 6 in 1 Card Reader- compatible with 6 different media: CF/IBM Microdrive/SM/SD/MMC/MS
- Great combination with fan controller and monitoring device
- Large EL back light LCD Monitor with 8 colors
- Precision Electronic Button Control

\$109



Thermaltake Blue Orbll

- Patent Radian Crotched Fin - provides superior air flow
- Copper Core Construction-allows for rapid heat transfer & increased thermal conductivity
- Silent Blue LED Fan- whispering 17dBA
- Massive Aluminum fin count: 140fins - maximizes heat dissipation area

\$59



Thermaltake Big Typhoon VX

- Application for Intel P4 LGA 775, AMD K7, K8
- 6 Heatpipes, transfer the heat quickly
- High density aluminum fins provide more surface area for good heat dissipation
- Copper base solder
- 12 cm silent fan, perform well at low noise, 16dBA only

\$79



Thermaltake Mini Typhoon

- Best performance, supports up to TDP 130W
- Heatsink:
 - 6 heatpipes, maximized heat transfer
 - All copper structure, provides extremely fast heat conductivity
 - 0.2mm thick copper fins and perfect fin rate
 - Waved fins
 - 3 in 1 application for LGA775, K8 and AM2
- RX Type Flow reduce the noise to only 18dBA

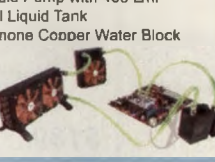
\$69



Thermaltake BigWater 745 Liquid Cooling System

- Application for Intel P4 LGA775 Intel BTX platform and all AMD K8 series
- Remarkable 120mm Radiator
- Superb Liquid Pump with 400 L/hr
- Exceptional Liquid Tank
- Second-to-none Copper Water Block
- Durable 3/8" Tube

\$199



Thermaltake 80/120mm Smart Case Fan

Thermaltake Smart LED Fan :

- Full speed when jumper on
- Temperature control : Fan speed varies according to the temp detected by the sensor
- Manual control : Adjust fan speed manually

\$19/25



GIGABYTE ED821-MF

- Supports AMD Athlon™ FX 55 / Athlon™ 64 4000+
- Large 9425 fan also cools surrounding components
- Large diameter pure copper core
- Adjustable fan speed control panel (1700 ~ 3500RPM)
- High airflow & low noise fan frame design 19 dB(A)

\$39



GIGABYTE PDU21-MF

- Universal 4-in-1 design fits all mainstream platforms
- Omni-directional cooler design with new advanced sintered powder wicks
- Quad high-performance heatpipes
- Quad-Way Airflow Design
- Solid pure copper base with nickel-plating finish
- Sparkling fan control box (1700 ~ 3200 rpm)

\$59



ZALMAN Reserator1 Plus Fanless Water Cooler

Reserator 1 Plus Fanless Water Cooling System, Anodized Pure Aluminium BLACK, incorporates Zalman's HCET (High Capacity Extrusion Technique) technology, unites the functions of a reservoir/radiator/water pump, Max 2.5L Coolant Capacity, Integrated 5W QMax 300L/h water pump

\$339



ZALMAN Fatality FS-C77

Zalman Fatality FS-C77 (Copper) CPU Cooler, for Intel S775/478 and AMD S754/939/940 CPUs, 120mm fan with red LEDs, Pure Copper material, Dissipation area: 3.268 cm cub, 2 Ball bearing Sets, Speed: 2400RPM, Thermal Resistance: 0.17 C/W, Noise level: 42.5dB

\$79



ZALMAN Fatality FS-V7

Zalman FS-V7 Fatality (Copper) Video Card Cooler, 2 Ball bearings, 80mm fan with red LEDs installed in the heatsink (FHS) cools not only the VGA chipset and VGA RAM, but all other VGA components as well, Ultra large surface area for excellent heat dissipation. Fan Speed: 3500RPM, Noise Level: 36dB

\$59



ZALMAN VF700-CU VGA Fan

Zalman VF700-Cu (Copper) Video Card Cooler, 2 Ball bearings, Fan Speed: 1350 ~ 2650RPM (+/- 10%), Noise Level: 18.5 ~ 28.5dB

- Does not generate noise or vibration in Silent Mode
- Pure Copper base material
- Silent Mode and Normal Mode selection

\$49



ZALMAN VF900-CU VGA

Zalman VF900-Cu LED (Copper) Dual Heatpipe Video Card Cooler with Blue LEDs, 2 Ball bearings, Includes VGA RAM Heatsinks and Fan Speed Controller, Fan Speed: 1350RPM±10% (Silent Mode), 2400RPM±10% (Normal Mode), Noise Level: 18.5±10% (Silent Mode), 25dB±10% (Normal Mode), Heatsink Dimensions - 96(L) x 96(L) x 30(H) mm, Weight - 185g

\$59



ZALMAN CNPS 7000B-CU

- Compatible with Intel Pentium 4 (Socket 478), AMD Duron/Athlon/Athlon XP (Socket 462), and Sempron/AMD64 (Socket 754/939/940)
- Pure Copper base material
- 92mm fan inside the FHS
- Adjustable fan speed controller

\$59



ZALMAN CNPS 7700-CU

- Compatible with Intel Pentium4 Socket 775/478, AMD Sempron/AMD64 Socket 754/939/940 CPUs
- Does not generate noise or vibration
- Pure Copper base materials
- Large 120mm fan inside the FHS
- Adjustable fan speed controller

\$69



ZALMAN CNPS 8000

- Compatible with Slim and LowProfile Computer
- Noiseless and vibration-free operation
- Optimum performance and quick heat dispersion achieved with the use of 4 heatpipes
- Compatible with Intel Socket 775, AMD Athlon 64 X2 Socket 939 and AMD Sempron/AMD64 Socket 754/939/940
- Ultra quiet 92mm fan.
- FAN MATE 2 included for manual adjustment of fan speed.

\$69



ZALMAN CNPS 9500 LED

- 100% copper heatsink with aerodynamically optimized "tunnel"
- Innovative and patented, curved heatpipe
- Optimized heatsink layout
- Ultra quiet 92mm opaque fan with blue LEDs
- 0.2mm ultra-slim fins
- Aerodynamically optimized heatsink
- Compatible with Intel 775 & AMD 939 CPUs

\$79



ZALMAN CNPS 9700 LED

Zalman CNPS9700LED CPU Cooler, Intel Socket 775, AMD Socket AM2/754/939/940, 2 Ball-bearing fan, Speed: 1250RPM±10% Silent Mode, 2800RPM±10% Low-Noise Mode, Noise Level: 19.5dB±10% Silent Mode, 35dB±10% Low-Noise Mode, 100% copper heat-sink with aerodynamically optimized tunnel design

\$89



Antec SLK1650
Antec SLK1650B Solution Series ATX MiniTower - BLACK, 350W PSU, drive bays: 3x5.25" and 2x3.5" external, 3x3.5" internal, front USB, Prescott P4 ready



\$109

Antec Nine Hundred
Antec "Nine Hundred" Gaming Case with Side Window - Black, NO PSU, 9 Drive Bays, Top mounted 200mm exhaust fan, Top USB/IEEE1394/Audio



\$189

Antec Atlas
Antec 'Atlas' Server Case - BLACK, 550W PSU, 8 drive bays 4 x 3.5" internal & 4 x 5.25" external, Front USB/IEEE1394 & Audio ports, ATX



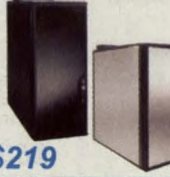
\$229

Antec P150
Antec P150 "Performance One" ATX Mid Tower - High Efficiency 430W NEO HE PSU, 4 removable HDD bays, 120mm TriCool FAN, Front USB, Audio, 1394, ATX



\$239

Antec P180
Antec P180 Performance - NO PSU, 11 Drive Bays, up to 5 Configurable Fans, Front USB/IEEE1394/Audio



\$219

Antec P182SE
Antec P182SE "Performance One" Silver ATX Mid Tower - NO PSU, Mirrored panels, 11 Drive Bays, up to 5 Configurable Fans, Front USB/



\$289

Antec Sonatall
Piano Black, TruePower 430W PSU, Ultra Quiet Design, Blue LED, Front USB/IEEE1394/Audio, Washable air filter



\$185

Antec Solo
Antec 'SOLO' ATX MiniTower - Black/Silver, NO PSU, Piano Black Finishing, Drive Bays: 4x5.25" Ext, 4x3.5" Int, front USB/Firewire/Audio In & Out



\$139

Antec NSK1300
Antec NSK 1300, 300W PSU, Four drive bays: 1 x external 5.25", 3 x internal 3.5", Flip-Up drive cage, front ports include: 2 x USB, 1 x Audio In & Out, Three-layer side panel



\$139

Antec NSK2400
Antec NSK 2400 MicroATX Desktop Case - Black with Silver Bezel, 380W PSU, Drive Bays: 2x5.25" External, 2x3.5" Internal, 2xUSB



\$139

Antec NSK4400
Antec NSK 4400 MiniTower - Black with Silver Bezel, 380W PSU, Drive Bays: 3x5.25" & 2x3.5" External, 3x3.5" Internal, 2 x USB



\$129

Antec NSK6500
Antec NSK 6500 - Black with Silver Bezel, 430W PSU, Drive Bays: 3x5.25" & 1x3.5" External, 5x3.5" Internal, 2xUSB



\$159

Antec Minuet 300
Antec 'Minuet II' Slimline Case - Piano Black/Chrome, 300W PSU, 3 Bay drives, Top Panel with Vents, Front USB/IEEE1394/Audio, MicroATX



\$119

Antec Fusion
Antec 'Fusion' Desktop Case - Silver, VFD, 430W PSU, drive bays: 1x5.25" external & 2x3.5" internal, front USB/IEEE1394/Audio, mATX



\$269

Antec 4U22A Rackmount
black color, NO power supply, fits 12"x13" motherboard, lockable front cover Size: 335 x 570 x 700 mm



\$189

Antec Take3 Rackmount
3U Antec 'TAKE3' Quiet Rackmount Chassis, drive bays: 2 x 5.25" + 1 x 3.5" External, 3 x 3.5" Internal, 7 Expansion Slots, 450W PSU



\$379

Antec Titan650
Antec Titan650 Black Server Case, TruePower Trio 650W PSU, 10 drive bays 6x3.5" internal & 4 x 5.25" external, up to Extended ATX form factor



\$299

AOpen H360
• 250W or 300W peak proprietary
• FlexATX/MicroATX slim
• Supports front USB Audio, 1394 (optional)
• Changeable for Tower & Desktop



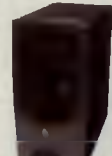
\$109

AOpen KA50
AOpen KA50 EZ solution has excellent expandability: 11 drive bays and 7 slots. 5.25" : 4 / 0 (external/internal) 3.5" : 2 / 5. Screwless & Easy installation



\$149

AOpen QF45B
AOpen QF45B (black & charcoal) Good expansion capability - 7 slots and 6 drive bays, MicroATX / ATX mid-tower, 300W PSU



\$79

COOLER MASTER Elite 330/331
Tool-Free mechanical design, Built-in washable front air filter, 120mm fans in front and rear, 350W PSU



\$85

COOLER MASTER Centurion V
• Front and side venting holes
• Screw-less locking
• Top I/O panel
• 430W PSU
• 120mm Case fan



\$115

COOLER MASTER Centurion 532
• Front and side venting holes • Screw-less locking
• Top I/O panel • 430W PSU



\$115

COOLER MASTER Centurion 534
• Superior Airflow • Tool-free Design • 120mm Case fan • 430W PSU



\$115

COOLER MASTER Mystique 632
Aluminum alloy, meshed front panel design; 120mm fans in the front and rear; Screw-less design; Built-in washable front air filter



\$169

COOLER MASTER ITower930
front hot swap module; Overall fixed tool-free design; Superior Thermal Solution; Durable 0.8mm cold rolled steel construction; Key lock and intrusion switch design



\$199

COOLER MASTER Stacker 810
Value-added functionality. Unmatchable upgrade ability. Superior Airflow
Available in: Silver or Black



\$209

COOLER MASTER Stacker 831
Value-added functionality. Unmatchable upgrade ability. Superior Airflow
Available in: Silver or Black



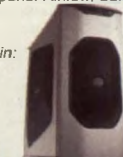
\$289

COOLER MASTER Stacker 832
Value-added functionality. Unmatchable upgrade ability. Superior Airflow
Available in: Black



\$329

COOLER MASTER Stacker 830 Evo
Value-added functionality. Unmatchable upgrade ability. Superior Airflow, SLI Ready
Available in: Silver or Black



\$329

LIAN LI PC60/61
Aluminium Case Silver or Black. Drive bays: 4x5.25", 3x3.5", 5x3.5" internal. Front USB: 2 ports.



\$189

LIAN LI V1000+
Aluminium Case, Drive bays: 5x5.25", 6x3.5" int. 2 x 12CM ball bearing fans. Front I/O: IEEE 1394x1, USB2.0x2



\$269

SILVERSTONE LC13
SilverStone LC13 ATX Desktop Case - Aluminium build, drive bays: 2x5.25"/2x3.5" external, 2x3.5" internal, Front USB2.0/IEEE1394/Audio/MIC, NO PSU
Available in: Black or Silver



\$159

SILVERSTONE LC17
SilverStone LC17 ATX Desktop Case - Aluminium build, drive bays: 2x5.25"/1x3.5" ext, 6x3.5" int, Front USB2.0/IEEE1394/Audio/MIC, NO PSU
Available in: Black or Silver



\$125

SILVERSTONE LC14M
SilverStone LC14M Aluminium build, VFD, Front USB2.0/IEEE1394/Audio/MIC, IR Remote, iMon, NO PSU
Available in: Black or Silver



\$259

SILVERSTONE LC16M
SilverStone LC16M Aluminium build, VFD, Front USB2.0/IEEE1394/Audio/MIC, IR Remote, iMon, NO PSU
Available in: Black or Silver



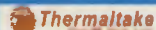
\$299



Soprano VB1430
 • High Efficient ventilation
 • Tool-Free when installing
 5.25" & 3.5" device
 • Dual USB 2.0, IEEE 1394, Audio & Speaker ports



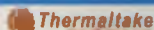
\$139/139



Armor Jr VC3430
 Thermaltake Armor Junior ATX Case, Dual 120mm silent front and back case fans. Fits Thermaltake liquid cooling system. 430W PSU



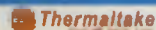
\$199/229



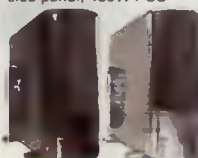
Armor VA8000
 Armor, Optimized Thermal Management, offers a great amount of space: Front Accessible 10 x 5.25", 2 x 3.5" and Internal 6 x 3.5"



\$239/289



Eureka VC8000
 Eureka Full tower, all aluminum chassis, 120mm silent front and rear case fans, Honeycomb see-through side panel. 430W PSU



\$249/249

GIGABYTE™ GZ-XCCL

Gigabyte slim design case coming with a Gigabyte True ATX 2.0 24/20 pin 300W power supply.



\$85

GIGABYTE™ GZ-FSCA1

3D Aurora
 • Aluminum body, high-end
 • Supports all liquid cooling sys
 • Dual security lock



\$179

ASUS TA881

• Superior Thermal Solution
 • Friendly Mechanical Design
 • Flexible Expansion Choices
 • 350W Power Supply



\$69

ASUS TA982

• Excellent Cooling Systems
 • Flexible Configuration
 • Quick and safety installation and maintenance
 • 350W Power Supply



\$79

ZALMAN HD160

Zalman HD160 HTPC ATX case, VFD display, Remote Controller, 2 x USB, 1 x IEEE1394, 2 x 80mm rear exhaust fans, 17-in-1 card reader, NO PSU



\$399

ShuttleSD37P2

Shuttle SD37P2, LGA775, i975X, FSB1066, Dual DDR2 667, 2xPCI-E X8, SATA 300 RAID, GbE LAN, USB2.0, SPDIF, 8Ch, 400W PSU



\$729

ShuttleSS30G2

Shuttle SS30G2, LGA775, SiS662, FSB800, DDR2, Int. VGA, PCI-Express x16, 10/100 LAN, IEEE1394a, USB2.0, 6Ch. 240W PSU



\$339

ShuttleSD32G2

Shuttle SD32G2, LGA775, i945G, FSB1066, Dual DDR2 667, PCI Express x16, SATAII 300, GbE LAN, USB2.0, 8Ch Audio, 250W PSU



\$449

Antec

EarthWatts

"Antec" EarthWatts ATX Power Supply, 80 PLUS certified, 80mm low noise cooling fan, Dual 12V outputs, 1 x PCI-Express, 4 x SATA, 6 x IDE



430W \$99
500W \$129

Antec

TruePower Trio

Antec TruePower Trio PSU, 120mm fan, Dual PCI-E & 4 SATA Connectors



430W \$109
550W \$159
650W \$199

Antec

NeoHE 2.2

Antec Neo Highly Efficient 2.2 ATX & EPS 12V Power Supply, Noise Level less 18dBA, includes PCI-E Graphics Card Connector, SATA Connectors



500W \$149
550W \$169

OCZ

GameXStream

OCZ SLI-Ready GameX-Stream are designed for the demanding computing environments of PC Enthusiasts



600W \$169
700W \$199

SILVERSTONE

ST65Z / 75Z

SilverStone 650 or 750 Watt Power Supply, SLI ready, Titanium black, 80mm fan, Dual PCI-E 6pin / Four SATA connectors, Active PFC



650W \$169
750W \$219

ZALMAN

Noiseless

ZM460/ ZM600

• ATX12V PSU, supporting Intel Pentium 4 and AMD CPUs • Come with SATA connectors



460W \$129
600W \$189

COOLER MASTER

eXtreme

Coolermaster eXtreme PSU, enhances system reliability by preventing mains abnormal supply from spikes and surges.



430W \$59
550W \$89
650W \$119

COOLER MASTER

iGreen

iGreen Power is the world first power supply which achieves 85% efficiency through Double Forward Switching Circuit Technology.



500W \$129
600W \$159

COOLER MASTER

Real Power

Pro 850W
 • First six +12V rails for better power distribution in Quad-SLI and 2 ways server
 • Four 6 pin PCI-E connector
 • Ultra-silent operation with intelligent 135mm fan speed control (< 16dBA)



\$279

Seasonic

S12

Seasonic S12 supports the latest P4 Prescott and Athlon 64/64 FX processors, as well as PCI Express and Serial ATA.



430W \$129
550W \$199
650W \$229

Seasonic

M12

The Seasonic M12 range of power supplies feature a detachable modular DC cable design and provide stable power for high end, high performance graphics applications.



500W \$219
700W \$299

Thermaltake

ToughPower

• SLI, Cross-Fire, and Dual Core CPU ready
 • Extremely good voltage regulation



600W \$179
750W \$229
850W \$289

APC CS/ES 500VA

APC Back UPS CS or ES 500 VA are reliable power protection for office and home office computers. It has USB support 500VA/300 watts capacity, USB compatible, hot swap batteries, RJ-11 Modem/Fax/DSL protection, unattended shutdown, also includes s/w and USB cable.



CS \$139
ES \$179

APC Back-UPS RS

APRC RS Series, High Performance Battery Backup & Protection for Business Computers. Up to six battery backup outlets with automatic voltage regulation (AVR) enable you to work through even the most frequent brownouts and power sags, keeping 75/90/110 minutes of battery power for when you need it most.



1000VA \$469
1500VA \$569

POWERWARE 3105

UPS Series

The compact Powerware 3105 UPS makes it affordable for the smallest offices and home offices to have surge suppression and backup power to protect PCs, peripherals, fax machines, and telephone equipment.



350VA \$69
500VA \$79
700VA \$99

POWERWARE 5110

UPS Series

The Powerware 5110 UPS delivers the ultimate in power quality, constantly safeguarding your equipment from power outages, surges, sags, brownouts, and over-voltage conditions. Typical Backup Time at full load: 3 minutes, at half load.



700VA \$129
1000VA \$229
1500VA \$259

POWERWARE 5115

UPS Series

The Powerware 5115 UPS offers excellent backup power protection and power quality management for PCs. It delivers basic surge protection and backup power, it additionally offers the best UPS power protection against five of the nine common power quality problems.



500VA \$289
1000VA \$509

ASUS 256MB

7300GS HTD PE

Chipset NVIDIA GeForce 7300 GS
Memory 256MB, 64bits DDR2
Bus PCI-Express
TV out, DVI Port, Twin View



\$89

ASUS 256MB

7300GT Silent HTD PE

Chipset NVIDIA GeForce 7300 GT
Memory 256MB, 128bits DDR2
Bus PCI-Express
TV out, DVI Port, Twin View



\$119

ASUS 7600GS Silent

HTD PCIE

Chipset NVIDIA GeForce 7600 GS
Memory 256/512MB, 128bits DDRII
Bus PCI Express 16X
TV out, DVI Port, Twin View

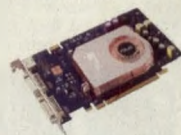


256MB \$129
512MB \$169

ASUS 256MB 7600GT

2DHT PCIE

Chipset NVIDIA GeForce 7600 GT
Memory 256MB, 128bits DDRIII
Bus PCI Express 16X
TV out, DVI Port, Twin View

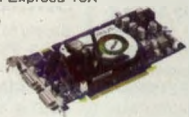


\$169

ASUS 256MB 7900GS

2DHT PCIE

Chipset NVIDIA GeForce 7900 GS
Memory 256MB, 256bits DDRIII
Bus PCI Express 16X
TV out, DVI Port, Twin View



\$209

ASUS 256MB 8500GT

Silent PCIE

Chipset NVIDIA GeForce 8500 GT
Memory 256MB, 128bits DDRIII
Bus PCI Express 16X
TV out, DVI Port, Twin View



\$179

ASUS 256MB 8600GT

Silent PCIE

Chipset NVIDIA GeForce 8600 GT
Memory 256MB, 128bits DDRIII
Bus PCI Express 16X
TV out, DVI Port, Twin View



\$249

ASUS 256MB

8600GTS Silent PCIE

Chipset NVIDIA GeForce 8600 GTS
Memory 256MB, 128bits DDRIII
Bus PCI Express 16X
TV out, DVI Port, Twin View

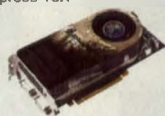


\$359

ASUS 320MB

8800GTS HTDP PCIE

Chipset NVIDIA GeForce 8800GTS
Memory 320MB, 320bits DDRIII
Bus PCI Express 16X
TV out, Dual DVI Port, HDTV



\$469

ASUS 256MB

X1950 Pro TD PCI E

Chipset ATI Radeon X1950Pro
Memory 256MB, 256bits DDRIII
Bus PCI-Express 16x
TV out, DVI Port, HDTV



\$249

GIGABYTE

256MB 7600GS TD AGP

Chipset NVIDIA GeForce 7600GS+HIS
Memory 256MB, 128bits DDRIII
Bus AGP 8x
TV out, DVI Port, D-SUB, MultiView



\$169

GIGABYTE 7300GS TD

PCI E

Chipset NVIDIA GeForce 7300GS
Memory 128/256MB, 64bits DDRII
Bus PCI-Express 16x
TV out, DVI Port, Twin View



128MB \$69
256MB \$89

GIGABYTE 256MB

7300GT TD PCI E

Chipset NVIDIA GeForce 7300GT
Memory 256MB, 128bits DDRII
Bus PCI-Express 16x
TV out, DVI Port, Twin View



\$119

GIGABYTE 7600GS TD

PCI E

Chipset NVIDIA GeForce 7600GS
Memory 256/512MB, 128bits DDRII
Bus PCI-Express 16x
TV out, DVI Port, Twin View



256MB \$129
512MB \$169

GIGABYTE 256MB

7900GS TD PCI E

Chipset NVIDIA GeForce 7900GS
Memory 256MB, 256bits DDRIII
Bus PCI-Express 16x
TV out, Dual DVI Port



\$259

GIGABYTE 256MB

8500GT TD PCI E

Chipset NVIDIA GeForce 8500GT
Memory 256MB, 128bits DDRIII
Bus PCI-Express 16x
TV out, Dual DVI Port

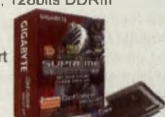


\$169

GIGABYTE 256MB

8600GT TD PCI E

Chipset NVIDIA GeForce 8600GT
Memory 256MB, 128bits DDRIII
Bus PCI-Express 16x
TV out, Dual DVI Port



\$229

GIGABYTE 256MB

8600GTS TD PCI E

Chipset NVIDIA GeForce 8600GTS
Memory 256MB, 128bits DDRIII
Bus PCI-Express 16x
TV out, Dual DVI Port



\$339

GIGABYTE 320MB

8800GTS TD PCIE

Chipset NVIDIA GeForce 8800GTS
Memory 320MB, 320bits DDRIII
Bus PCI Express 16X
TV out, Dual DVI Port, HDTV



\$459

GIGABYTE 768MB

8800GTX TD PCI E

Chipset NVIDIA GeForce 8800GTX
Memory 768MB, 384bits DDRIII
Bus PCI-Express 16X
Dual DVI, HDTV



\$879

GIGABYTE 256MB

X1950 Pro TD PCI E

Chipset ATI Radeon X1950Pro
Memory 256MB, 256bits DDRIII
Bus PCI-Express 16x
TV out, DVI Port, HDTV



\$259

XFX 7600GS TD AGP

Chipset NVIDIA GeForce 7600GS
Memory 256/512MB, 128bits DDRII
Bus AGP 8X
TV out, VGA and DVI, Twin View



256MB \$179
512MB \$219

XFX 256MB 7600GT

TD AGP

Chipset NVIDIA GeForce 7600GT
Memory 256MB, 128bits DDRIII
Bus AGP 8X
TV out, Dual DVI, Twin View

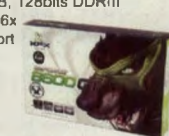


\$229

XFX 256MB 8600GT

TD PCIE

Chipset NVIDIA GeForce 8600GT
Memory 256MB, 128bits DDRIII
Bus PCI-Express 16x
TV out, Dual DVI Port
XXX Version
Clock Speed: 600Mhz



\$229

XFX 256MB 8600GTS

TD PCIE

Chipset NVIDIA GeForce 8600GTS
Memory 256MB, 128bits DDRIII
Bus PCI-Express 16x
TV out, Dual DVI Port
Clock Speed: 675 / 730Mhz

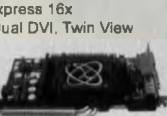


675Mhz \$349
730Mhz \$379

XFX 512MB 7950GT

TD PCIE

Chipset NVIDIA GeForce 7950GT
Memory 512MB, 256bits DDRIII
Bus PCI-Express 16x
Video in & TV out, Dual DVI, Twin View
Clock Speed: 570 / 610Mhz



570M \$389
610M \$429

XFX 320MB / 640MB

8800GTS TD PCIE

Chipset NVIDIA GeForce 8800GTS
Memory 320/640MB, 320bits DDRIII
Bus PCI-Express 16x
Dual DVI, HDTV
Clock Speed: 500Mhz



320MB \$459
640MB \$619

XFX 768MB 8800GTX

TD PCIE

Chipset NVIDIA GeForce 8800GTX
Memory 768MB, 384bits DDRIII
Bus PCI-Express 16x
Dual DVI, HDTV
Clock Speed: 630Mhz



\$969

POWERCOLOR 256MB

X1950Pro AGP

Chipset ATI Radeon X1950Pro
Memory 256/512MB, 256bits DDRIII
Bus AGP 8x
TV out, Dual DVI, Twin View



\$299

POWERCOLOR X1950Pro

Extreme PCIE

Chipset ATI Radeon X1950Pro
Memory 256/512MB, 256bits DDRIII
Bus PCI Express 16X
Video in/TV out, Dual DVI, Twin View



256MB \$269
512MB \$319

Leadtek*256MB 7600GT TDH AGP

Chipset NVIDIA GeForce 7600GT
Memory 256MB, 128bits DDR3
Bus AGP 8X
Dual-Link DVI, HDTV



\$239

Leadtek*768MB 8800GTX TDH PCI E

Chipset NVIDIA GeForce 8800GTX
Memory 768MB, 384bits DDRIII
Bus PCI-Express 16x
Dual DVI, HDTV



\$869

Leadtek*128MB Quadro FX560 PCI E

Chipset NVIDIA Quadro FX 560
Memory 128MB, 128bits DDRIII
Bus PCI Express 16X
DVI-DL+DVI-SL+HDTV



\$389

Leadtek*256MB Quadro FX1500 PCI E

Chipset NVIDIA QuadroFX1500
Memory 256MB, DDRIII
Bus PCI Express 16X
Dual DVI, Dual-Link, HDTV Out



\$859

Leadtek* TV2000 XP

WinFast TV2000 XP is your best personal digital video recorder with video editing & authoring. It is the most effective way of turning your PC into a high definition TV and FM entertainment center.



RM \$49
Expert \$79

Leadtek*DTV Dongle

Portable DVB-T USB2.0 TV Box:
• Picture-in-Picture (PIP), POP, PAP
• Time-Shifting
• Capture format profile
• Scheduled Power-up Recording
• All-in-one Control Panel



\$99

Leadtek* DTV1000 T

Digital Video Broadcasting Terrestrial TV Card:
• Picture-In-Picture (PIP), Picture-On-Picture (POP)
• Exclusive M.V.P mode
• Time-Shifting
• Powerful schedule
• Capture format profile
• All-in-one control panel



\$89

Leadtek* DTV2000 H

With winfast DTV2000 Hybrid PCI TV Tuner, You can watch analog or high quality digital TV, listen to FM radio or DVB-T radio and record videos on your PC!



\$109

Leadtek* DV2000

• Watch TV in Stereo/SAP & Listen to FM in Stereo
• Provides 3 1394 ports for DV camcorder and other 1394 devices
• Convert your DV and Home Videos to VCD/DVD Directly



\$99

Leadtek* PVR3000 Deluxe

WinFast PVR3000 Deluxe an enhanced PCI 3D/Y/C Hardware MPEG/II encoder TV card, allows you to enjoy live full-band antenna TV or cable TV programs on your PC.



\$159

COMPRO TECHNOLOGY VideoMate U300

Compro VideoMate U300 DVB-T Stick is a thumb size digital TV tuner box with remote control. It is easy to put into your pocket or computer bag and plug it in anywhere at anytime to receive high quality free-to-air digital terrestrial TV broadcast on your desktop or laptop PC.



\$79

COMPRO TECHNOLOGY VideoMate T750

A dual PCI DVB-T and analog TV/FM tuner card, which brings HQ digital terrestrial TV and universal analog TV/FM broadcasts to your PC and turns it into a home entertainment center by bringing digital/analog TV viewing, video/audio capturing, and personal digital video recording capabilities.



\$139

AveMedia AVerTV Hybrid+FM

AveMedia AVerTV Hybrid + FM PCI or Cardbus. Watch Analog TV (PAL) or High Quality Digital Terrestrial TV (DVB-T) programs and FM Radio broadcasts on PC or Laptop.



PCI / Cardbus

\$119/119

AveMedia AVerMedia TV Hybrid + FM Volar

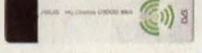
AveMedia TV Hybrid + FM Volar, USB 2.0 Pen Drive, Watch TV on PC/Notebook, 75 Ohm Coaxial TV Antenna/Composite/S-Video/FM, Remote & FM Antenna



\$129

ASUS My Cinema U3000Mini

• Watch and record digital TV programs (DVB-T free-to-air) on PC or notebook
• Time Shifting function for temporary leave
• Manually schedule recording
• One-touch recording from EPG
• Vista Premium / Vista Basic / XP / MCE supported



\$79

Fusion Pro HDTV DVB-T Hybrid

• Watch both digital & analogue TV on a PC.
• Record TV Programs to HDD as DVD/ MPEG2 Format. • Scheduled recording from Stand-by mode.
• Pause and replay live TV shows. • Low profile form factor for slim PC



\$159

Fusion Dual 2 Dual Digital

• Record TV to HDD, Scheduled recording & Time Shift. • 2 Hi-Def Digital TV tuners, Low Profile PCI Card. • Watch OneChannel While Recording Another.
• Full function MCE style infrared remote control.



\$189

Fusion Nano USB HDTV

Highly Portable
• Supports any notebook as well as desktops
• Bus-powered
• Small form-factor and fancy design fits into your pocket
High resolution, crystal clear picture quality
Remote Control Included



\$129

Hauppauge! HVR-1100MCE

Digital HDTV

The Hauppauge HVR1100-MCE is specially designed for use and integration with MS Windows Media Centre. It provides sharp, clear viewing and capture of free-to-air digital SD and HD television*, FM radio or DVB-T radio.



\$149

Hauppauge! HVR-1300MCE

Digital HDTV

Internal PCI digital or analogue TV receiver for Windows® XP Media Center Edition. Supports Australian Digital SD/HD TV Built-in hi-quality hardware MPEG encoder.



\$209

Hauppauge! WinTV-PVR-150 MCE i.p.

WinTV-PVR-150 MCE i.p. brings live TV, FM radio and TV recording to your low profile Media Center system. It also runs with third party applications like BeyondTV and SageTV, too!



\$159

Hauppauge! PVR-500MCE oem

PCI Analogue Dual TV Tuner each with a Nicam Stereo Decoder. SVHS, Composite, Stereo RCA Audio and RF Inputs.FM Stereo Radio Receiver for Windows® XP Media Center Edition.



\$289

Hauppauge! Nova-T 500MCE PCI Dual Digital

• True single PCI slot / dual tuner solution.
• State-of-the-art technology.
• Designed for Windows XP Media Center Edition.



\$219

TWINHAN VP7045A

Mobile HDTV USB2

With sleek appearance and miniature height, TwinhanDTV Alpha changes the way you watch TV by its easy applications and high portability. High speed USB 2.0 transmission gives you superb resolution of HDTV without ghost and snow



\$79

PINNACLE PCTV 310i

• Watch & record HDTV or analogue TV on your PC • Listen & Record FM Radio, DAB Digital Radio, Internet Radio • Timeshifting for pausing & replaying live TV • Record to MPEG-1, MPEG-2, or direct to DVD • Channel Name Recognition • Teletext



\$169

PINNACLE Studio Plus700

Pinnacle Studio 10 PLUS with Internal PCI or External USB, Includes Studio 10PLUS editing software
• Copy contents of your Hi-8, VHS, SVHS to PC.
• Import MPEG-1, MPEG-2, AVI, WAV, MP3 Files.



Int. PCI/Ext. USB \$349/389

CREATIVE Audigy Value

The Upgrade Solution for Basic Motherboard Audio to High Quality 24-bit, 7.1 Audio. Delivering audio quality of up to 24-bit / 96KHz, 100dB SNR clarity and 7.1 surround sound, Sound Blaster Audigy Value is the ideal upgrade to high quality audio from basic motherboard audio.

\$55



CREATIVE X-Fi Xtreme

Audio

- Restore the details and vibrance that your music lost during MP3 compression
- Enjoy all your music and movies in surround sound on virtually any speaker system or headphones

\$119



CREATIVE X-Fi Xtreme

Music

The Sound Blaster X-Fi XtremeMusic sound card harnesses the full power of the Creative X-Fi Xtreme Fidelity audio processor to Upgrade any existing library of MP3 or any music files to the Xtreme Fidelity audio standard.

\$169

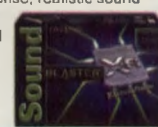


CREATIVE X-Fi Xtreme

Gamer

The Sound Blaster® X-Fi™ XtremeGamer sound card delivers faster audio performance and intense, realistic sound in all your games. Headphone surround sound is better too.

\$199



CREATIVE X-Fi Platinum

Sound Blaster X-Fi Platinum promises a sensory delight for your ears. Versatile enough for home digital entertainment, X-Fi Platinum is also ideal for all your audio creation needs. You can choose from: Entertainment, Audio Creation & Gaming Mode.

\$259



CREATIVE X-Fi Fatal1ty

Designed to meet the performance demands of the world's best-known professional gamer, the Sound Blaster X-Fi Fatal1ty™ FPS sound card provides stunning 109dB SNR audio quality, accelerates gaming performance and includes 64MB of on-board X-RAM for high performance gaming.

\$349



CREATIVE X-Fi Elite Pro

Sound Blaster® X-Fi™ Elite Pro is the "top of the line" answer to those looking for the very best in audio creation and home entertainment - with all the power and features of the entire Creative Sound Blaster X-Fi family of sound cards bundled into one ultimate solution!

\$629



ALTEC LANSING FX6021

Featuring two ultra-slim satellites with a total of 12 one-inch neodymium full-range micro drivers, LaserSound technology enables the system to deliver crisp, clean, full-volume sound.

\$249



ALTEC LANSING MX5020

The Ultimate Speaker System from Altec Lansing

- Not only looks great, but sounds amazing
- Featuring a polished, piano-quality black finish
- Accurate, clear and crisp sound

\$119



ALTEC LANSING MX5021

Featuring a polished, piano-quality black finish, MX5021 delivers big time in a powered audio system that not only sounds great - but looks terrific. Wireless Remote Control Pod-Control of bass, treble and master volume levels is at your fingertips.

\$179



ALTEC LANSING VS2220

Altec Lansing VS2220 Features:

- High-Quality Stereo
- Built-in Controls
- Distinctive Styling
- Headphone Jack
- Shielded Satellites

\$49



ALTEC LANSING VS2321

Altec Lansing VS2321 2.1 piece flat panel speaker system, Xdb technology, SFX technology, Headphone Jack, new modern stylish design, pure rich sound, second to none in quality, style & performance.

\$89



CREATIVE Inspire M2600

The Inspire M2600 delivers natural and accurate tonal quality, the formula for great sounding audio system at an amazing price. With the wired remote control, add a touch of convenience in your hand!

\$59



CREATIVE Inspire 5200

Taking advantage of a front center speaker, This 5.1 system provides the most immersive PC entertainment with direct, in-your-face action in EAX® and DirectSound® 3D games and DVD movies.

\$79



CREATIVE Inspire M5300

Creative Inspire® M5300 speaker system is designed to complement any room, 5.1 add-in or built-in sound card. Great power, Awesome realism; Distinctive design, Tiny footprint; Fingertip control.

\$99



CREATIVE Inspire T6060

Unparalleled Style and Power for Exhilarating 5.1 Games and Movies, Creative Inspire T6060 has: Two-way satellite speaker design; Wood subwoofer; Powerful center speaker; Flared port; Small footprint; Wired remote control

\$149



CREATIVE I-Trigue 3400

Creative I-Trigue 3400 system is engineered to reach an optimum balance of lows, mids and highs, delivering impressive audio and clarity with clean, strong bass. Enjoy even greater versatility when you connect your speaker system to virtually any audio device.

\$129



CREATIVE Gigaworks T20

Featuring quality components such as cloth dome tweeters, stylized woven glass fibre cone drivers and BasXPort™ technology, the GigaWorks T20 is set to deliver unparalleled performance that will change your perception of desktop speakers.

\$129



Logitech V20

The Logitech® V20 USB Notebook Speakers offer a convenient, high-quality speaker system for your laptop with rich, full sound and deep bass—all in a lightweight, portable design.

\$79



Logitech MM50

Logitech mm50 Portable Speakers for iPod uses 3" pressure drivers to maximize bass and minimize distortion. The rechargeable Li-ion batteries last up to 10 hours, and you can charge both the speaker system and iPod battery simultaneously.

\$149



Logitech R20

The Logitech R-20 2.1 speakers enhance your games, movies, and music. They offer dynamic audio in a sleek, compact design. Their ported wood subwoofer displaces more air for deep bass.

\$39



Logitech X140

Logitech's X-140 stereo speakers feature dynamic, real-time bass equalisation to maximise low frequency response while minimising distortion.

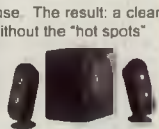
\$49



Logitech X-230

The high-tech subwoofer adjusts itself dynamically to deliver distortion-free bass. And the two all mountable satellite speakers eliminate the uneven sound response. The result: a clear, uniform sound field without the "hot spots" and inconsistency of other dual-driver satellites.

\$59



Logitech X530

The high-tech subwoofer adjusts itself dynamically to deliver distortion-free bass. And five wall-mountable satellite speakers use Logitech's patented FDD2™ technology to eliminate the uneven sound response.

\$89



Logitech Z-2300

The Z-2300 pound out powerful distortion-free bass from a 20 cm (8") long-throw subwoofer. Polished aluminium phase plug drivers combine the clarity of a tweeter with the richness of a separate mid-range for an all-encompassing listening experience.

\$179



Logitech Z4

The Z-4 features a modern audio inspired design with high-gloss and durable cast metal finish. Award-winning pressure driver subwoofer technology delivers unparalleled distortion-free bass and the sleek satellites feature one active and two pressure drivers.

\$109



Logitech Z5500D

For the ultimate entertainment experience: Logitech's THX-certified, 500 watt Z-5500 Digital 5.1 speaker system delivers high-fidelity digital sound for DVD players, PCs, video game consoles, and more.

\$399



Logitech Z5450D

Logitech Z-5450D Wireless Speakers, the Digital Sound-Touch™ Control Centre, supports Dolby® Digital and DTS® soundtracks and includes digital and analogue inputs for connecting DVD players, PCs, video game consoles, MP3 players, and more.

\$369



Logitech Quick-Cam Messenger

- Add live video to MSN® Messenger
- Capture sound with the built-in microphone
- E-mail videos and photos easily
- Broadcast live video, email video and photos, and create web albums



\$39

Logitech Quick-Cam IM

- Send real-time video to anyone on your IM list... no camera necessary on receiving end
- Make live video calls to stay connected to long distance friends and family
- Capture videos and photos and e-mail them in one click
- bonus headset



\$59

Logitech® Quick-Cam® Notebooks

- A compact, portable, full-color web camera that's perfect for students, mobile professionals and anyone who wants to stay in touch while on the road. It fits snugly to any notebook computer and does everything you'd expect a webcam to do.



\$59

Logitech QuickCam Notebooks Pro

- Video capture: Up to 640 x 480 pixels
- Still image capture: Up to 1280 x 960 pixels, 1.3 megapixels
- Frame rate: Up to 30 frames per second
- Integrated Notebook mount
- H-quality VGA CCD sensor
- Built-in microphone



\$119

Logitech QuickCam Chat

- Quality sound
- Bonus imaging editing software included
- Mounts easily with the included universal monitor clip
- Works with the most popular instant messaging applications



\$49

Logitech QuickCam Communicate STX

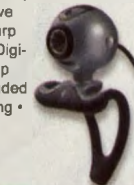
- Logitech QuickCam Communicate, 640 x 480 Video resolution, still image capture at 1.3 Megapixels, Microphone for clear audio and flat-panel clip.



\$69

Logitech Quick-Cam Pro 5000

- Designed to provide a more personal communication experience, Quick-Cam Pro 5000's exclusive technologies ensure sharp video and clear audio. Digital Zoom • Flat Panel Clip Included • Headset Included • Intelligent Face-Tracking • Microphone • PC • USB



\$109

Logitech QuickCam Fusion

- Logitech QuickCam Fusion provides true 1.3 megapixel sensor quality with Logitech RightLight™ Technology combined with a high quality built-in microphone and Acoustic Echo Cancellation (AEC) and noise reduction technology for outstanding hands free/headset free video calling performance.



\$129

Logitech QuickCam Sphere

- Easily add live video to MSN Messenger with fast video 320 x 240 image size
- Works with video-enabled Yahoo/Windows Messenger
- Make live video calls using the built-in microphone
- Always stay in the frame
- Record high quality videos at true 640 x 480 resolution
- Capture 1.3MP photos



\$169

Logitech Quick-Cam Ultra Vision

- Unsurpassed image quality, with an extra large glass lens. QuickCam® Ultra Vision uses Logitech RightLight™2 Technology to give you the highest quality image regardless of your lighting, and RightSound™ for clear, echo-free audio. It's video calling that truly is true-to-life.



\$169

ALTEC LANSING AHS322 Headset

- High-volume, premium 32 mm neodymium ear-phones deliver powerful, rich sound
- Noise canceling microphone helps eliminate background noise
- Soft foam ear-pads
- Gold-plated 3.5 mm connectors
- Handy in-line volume and microphone volume controller



\$29

ALTEC LANSING AHS302 USB Headset

- Stereo Headset with Microphone
- Dual USB • Analog connection
- Quality 36 mm neodymium ear-phones deliver a full, rich sound
- Discreet, contoured, behind-the-neck headband with leatherette ear-pads
- Noise canceling



\$69

PLANTRONICS Audio 350

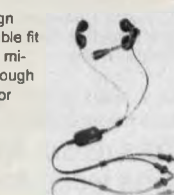
- Plantronics Audio 350 Headphone Features:
- 40 mm speakers convey rich, resonant stereo with maximum bass response
- Lightweight • Noise-canceling microphone boosts speech recognition accuracy
- QuickAdjust® telescoping, bendable boom assures ideal placement
- Boom slows discreetly when not in use



\$39

PLANTRONICS Audio 450

- Plantronics Audio 450 Headphone Features:
- Feather-light earbuds deliver full-range stereo sound
- Flex Grip® design provides unshakable fit
- Noise-canceling microphone cuts through background clamor



\$49

PLANTRONICS Audio 360

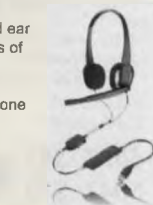
- Plantronics Audio 360 Headphone Features:
- Ample cushioned earpads provide maximum comfort
- Closed-ear design delivers total game immersion
- Noise-canceling mic cuts through background clamor
- 40mm speakers dish up maximum bass response



\$49

PLANTRONICS Audio 500

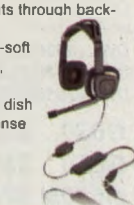
- Plantronics Audio 500 Headphone Features:
- Noise-canceling mic cuts through background clamor
- Soft, swivel-mounted ear cushions ensure hours of comfort
- QuickAdjust™ boom assures ideal microphone placement
- Lightweight, flexible headband



\$69

PLANTRONICS Audio 510

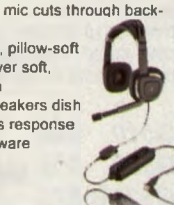
- Plantronics Audio 510 Headphone Features:
- Lightweight, flexible headband
- Noise-canceling mic cuts through background clamor
- Swivel-mounted, pillow-soft ear cushions deliver soft, acoustic precision
- 40mm stereo speakers dish up maximum bass response



\$79

PLANTRONICS Audio 550

- Plantronics Audio 550 Headphone Features:
- Lightweight, flexible headband
- Noise-canceling mic cuts through background clamor
- Swivel-mounted, pillow-soft ear cushions deliver soft, acoustic precision
- 40mm stereo speakers dish up maximum bass response
- PerSono™ Software



\$109

Logitech Premium USB Headset

- Logitech's Premium USB Headset provides superior audio quality and simple plug and play operation. Its noise-canceling microphone filters out unwanted background noise. The soft touch in-line volume and mute control is convenient.



\$59

Logitech Premium Notebook Headset

- Logitech Premium Notebook Headset features a behind-the-head, adjustable design that folds flat for travel. It is perfect for PC calling, Internet voice chat, gaming, and music. It offers high-performance audio, a noise-canceling microphone, and in-line volume and mute controls.



\$79

Logitech Mobile Traveller

- Logitech mobile traveller headset: Compact sophistication, great cordless clarity. Talk in style with ultra-compact, cordless headset; make calls even in windy conditions. Features: Multifunction Button • Bluetooth® Cordless • WindStop™ Microphone



\$79

ZALMAN ZM-RS6F+M Headphone

- Enhanced spatial and realistic effects by separating front, rear, and center speakers. Easy setup of real surround-sound by connecting the front, rear, center jacks to the 5 channel (or more) sound card in your PC. Real Surround Sound field comparable to a complete multi-channel speaker system.



\$69

Computer 2
wirelessly connected to
router using **DWL-G630**
Cardbus adapter



\$39

DSL-502T
ADSL Modem
\$69



dlink.com.au
Internet

Computer 1
with Ethernet connection
to **DI-524** Router



DI-524
Wireless Router
\$69



DSM-320 \$289
Wireless Media Player



Computer 3
wirelessly connected to
router using **DWL-G510**
PCI adapter



\$39

\$109
Console
Xbox or PS2 with
DWL-G810



Entertainment System

D-Link 8ports Switch
D-Link 8-Port 100 or Gigabit Auto-Negotiating Switch, Half-/Full-Duplex, IEEE 802.3x Flow Control, Auto-Polarity Correction, Expansion via MDI Uplink Port. Small & Portable in Size



DES1008D 10/100
DGS1008D Gigabit

DES1008D \$59
DGS1008D \$99

D-Link 4 / 7port Router
DI-704P / 704UP / 707P

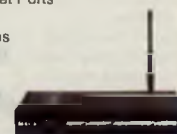
- Integrated Firewall
- Shares your Broadband & your printer
- Works with any Ethernet Cable / DSL
- Built in Telstra Cable client
- 4 or 7 10/100 Ethernet ports



704P \$69
704UP \$89
707P \$109

D-Link Wireless GamingRouter DGL-4300

- Optimized Gaming Experience with GameFuel Technology
- Up to 108Mbps* 802.11g Wireless
- 4 Gigabit Ethernet Ports
- Customizable Settings for Games and Applications



\$219

D-Link Wireless Access Point

- 802.11g wireless LAN standard
- 54 or 108Mbps data rate
- Compatible with 802.11b/g standards
- DHCP client/server
- User-selectable WEP data encryption



G700ap \$79
G710ap \$109
G730ap \$89
2100ap \$159

D-Link Wireless PCI
• Fully 802.11b standard compatible
• 256-bit WEP encryption provides you a higher level of security

DWL-G510 11/54Mbps
DWL-G520 11/54/108Mbps
DWL-G520M 11/54/108Mbps mlmo

G510 \$39
G520 \$59
G520M \$75



15x

D-Link Wireless PCMCIA
• 802.11g wireless LAN standard
• 32-bit CardBus performance
• Stronger network security with 64/128/256-bit WEP data encryption

DWL-G630 11/54Mbps
DWL-G650 11/54/108Mbps
DWL-G650M 11/54/108Mbps mlmo

G630 \$39
G650 \$59
G650M \$75



15x

D-Link ADSL Router
DSL-502T / DSL-504T

- Plug & Play USB/Fast Ethernet Connectivity
- Secure NAT/DHCP Functions
- Telstra Approved
- Supports all major ISP'S



502T 2port
504T 4port
502T \$69
504T \$79

D-Link ADSL Router
DSL-G604T Wireless

- 4 Port Fast Ethernet & 802.11g wireless connectivity
- Supports WPA Security
- Secure NAT/DHCP Functions
- Telstra Approved
- Supports all major ISP'S



\$119

D-Link Wireless Lan USB Key

- Up to 108Mbps
- 802.11g, 802.11b Compatible

DWL-G122 11/54Mbps
DWL-G132 54/108Mbps

DWL-G122 \$49
DWL-G132 \$69



15x

D-Link Wireless Router

- Up to 108Mbps
- Advanced Firewall & Parental Control

DI-524 11/54Mbps
DI-624 11/54/108Mbps
DI-624S 108Mbps

DI-524 \$69
DI-624 \$109
DI-624S \$139



D-Link DNS-323
2-Bay Network Storage

- Secure and Share Your Digital Files
- Insert Either One or Two Internal 3.5" SATA Hard Drives without Using Any Tools or Attaching Any Cables
- Protect Your Important Files with Mirrored Hard Drives Using RAID 1 Technology
- Access Stored Files over The Internet



\$289

D-Link DP-G310/G321
Wireless Printer Server

- High Speed 802.11g Wireless Printer Server
- Supports USB 2.0
- 802.11g Standard, 802.11b Compatible
- Easy Web-based Set up and Configuration

G310 1 x USB
G321 2xUSB, 1xPAR
G310 \$159
G321 \$209



54x

LINKSYS Wireless PCI
16LWMP54G/54GR/300N
 • 802.11g connectivity for your desktop PC
 • Data rates up to 54Mbps or 108Mbps
 • Interoperates with 802.11b networks
54G 11/54mbps
54GS 11/54/108mbps
300N High Speed 11
WMP54G \$59
WMP54GR \$99
WMP300N \$139



LINKSYS Wireless PCMCIA
16LWPC54G/54GR/300N
 • 802.11g networking for your notebook
 • Data rates up to 54Mbps or 108Mbps
 • Interoperates with 802.11b (11Mbps)
 • Advanced wireless security: WPA and up to 128-bit encryption
WPC54G \$59
WPC54GR \$99
WPC300N \$139



LINKSYS Wireless Router
WRT54G / 54GL / 150N
 • 802.11g Access Point
 • Data rates up to 54Mbps or 108Mbps
 • Interoperable with Wireless-B devices
 • Advanced security: WPA, wireless MAC address filtering, powerful SPI firewall
WRT54G \$99
WRT54GL \$109
WRT150N \$139



LINKSYS WAG54G V3
ADSL / Router
 • Built-in Router and 4-port Switch to share the Internet
 • Built-in Wireless-G (802.11g) Access Point also lets you connect without running wires
 • Advanced firewall and security features
\$139



BILLION 7402LM
ADSL2+ Modem/Router with 4-port Switch
 • High-speed Internet Access with ADSL2+ up to 24Mbps
 • SOHO Firewall Security with DoS Prevention and SPI
 • Parental Control with URL Blocking and Packet Filtering
\$149



BILLION 7402R2M ADSL
VPN Modem / Router
 • VPN with 3DES is up to 3.5 Mbps
 • SOHO Firewall Security with DoS Prevention and SPI
 • Parental Control with URL Blocking and Packet Filtering
 • High-speed Internet Access with ADSL up to 8Mbps
\$179



NetComm NB5 ADSL-2
Modem Router
 • Supports ADSL and ADSL-2
 • Advanced SPI Firewall
 • VPN pass-through
 • USB and Ethernet ports
 • Universal Plug & Play (UPnP)
 • Quality of Service (QoS)
 • Video Tutorials
\$69



NetComm NB5 Plus4/4W
ADSL2 Modem Router
 • Netcomm ADSL2+ Ethernet Modem/Router
 • Ethernet Connection
 • NAT Firewall Protection
 • DHCP Support
NB5 Plus4W: Wireless
NB5 Plus4 \$95
NB5 Plus4W \$125



NETGEAR Gigabit Switch GS105/ 108/ 116
 • 10/100/1000 Mbps Ethernet ports
 • High-speed, auto-sensing, full-duplex connections
 • Supports PC or Macintosh O/S
 • Silent operation for a peaceful work environment
5/ 8/ 16port
\$99/139/339



NETGEAR Rackmount Switch JFS516 / JFS524
 • 16 / 24ports 10/100 Rackmount Switch
 • Plug and Play
 • Auto-defects speed and duplex
 • Auto Uplink™ Technology makes the right connection
 • Rack mount kit included
16 / 24port
\$99/149



NETGEAR RP614
4Port Router
 • Lightning fast cable/DSL Internet sharing with integrated 4-port switch
 • NAT Firewall with VPN pass-through protects against hackers
 • Connects up to 253 network users. Parents may restrict and monitor access to inappropriate Web sites
\$69



NETGEAR Access Point
 • High Speed 54 or 108 Mbps Wireless
 • Supports Wireless Bridging and Repeater
 • Supports WPA-PSK for Better Wireless Security
WG602 \$79
WG102 \$169
WPN802 \$129



NETGEAR Print Server PS101 / PS121
 • Mini printer server 1port parallel or USB
 • Share a printer without sharing your PC
 • Handles multiple print jobs concurrently
 • Easy, Web-based remote management
PS101 Parallel
PS121 USB
PS101 \$99
PS121 \$119



NETGEAR USB2 Key WG111/WPN111/WN121T
 • 54, 108 Mbps or RangeMax standard 802.11g wireless
 • Works with all standard 802.11b/g wireless routers and access points
 • Compact, pocket-sized design
WG111 \$39
WPN111 \$59
WN121T \$169



NETGEAR Wireless PCI
 • 54Mbps, RangeMax or RangeMax next Wireless PCI to your desktop PC
 • 128-bit WEP encryption, upgradeable to Wi-Fi Protected Access (WPA)
WG311 11/54mbps
WPN311 RangeMax
WN311B RangeMax Next
WG311 \$39
WPN311 \$59
WN311B \$139



NETGEAR Wireless PCMCIA
 • 54Mbps, RangeMax or RangeMax next to the notebook • 128-bit WEP encryption, upgradeable to Wi-Fi Protected Access (WPA)
WG511 11/54mbps
WPN511 RangeMax
WN511B RangeMax Next
WG511 \$39
WPN511 \$69
WN511B \$139



NETGEAR SC101 Storage Central
 • Share your valuable files or keep them private with password protection
 • Protect and duplicate your valuable files, automatically
 • Supports IDE drives from 80GB to 800GB or more
\$139



NETGEAR WGR614 Wireless Router
 • Up to 54 Mbps in 2.4 GHz mode
 • Share your Cable/DSL Internet connection with or without wires!
 • Automatically detects and connects to your ISP
 • True Firewall with SPI and NAT
\$69



NETGEAR Wireless Router WPN824
 • Up to 1000% more wireless coverage and speed than 802.11g
 • RangeMax™ Smart MIMO
 • 7 Internal Smart Antennas adapt on the fly to interference
 • Smart Wizard™ Installation Assistant
\$109



NETGEAR Wireless Router WNR834B
 Netgear RangeMax Next Wireless Router – up to 270Mbps wireless networking
 • Simple and secure way to share your high-speed Internet connection throughout the home • Easy set-up
 • Maximum performance requires use of RangeMax NEXT Wireless-N adapters
\$189



NETGEAR Wireless Router WNR854T
 Netgear RangeMax Next Wireless-N Router Gigabit Edition
 • Built-in Ultra Fast 4-Port Gigabit Switch
 • Surf, email, stream HD video, on-line game, make Internet phone calls—simultaneously
 • Easy set-up
\$289



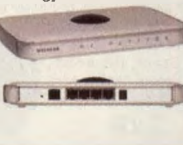
NETGEAR FWG114P Router
 • True Firewall with SPI & Intrusion Detection protection
 • Built-in 54 Mbps/802.11g Wireless Access Point, Integrated USB Print Server & NAT Routing
 • Wi-Fi Protected Access (WPA)
\$169



NETGEAR ADSL Router DG834/ 834G/ 834GT
 • Combines modem, router, switch, 802.11g access point, and SPI True Firewall
 • Up to 5X or 10X faster than 802.11b
 • True Firewall with SPI & DoS, VPN pass-through
 • Smart Wizard detects/connects to your ISP
DG834/834G/834GT
\$89/119/189



NETGEAR ADSL Wireless Router DG834PN
 108Mbps RangeMax ADSL Router:
 • Up to 500% greater coverage and speed than 802.11g
 • Smart MIMO technology with 6 Internal Antennas
 • Auto-adjusts to avoid interference on the fly
\$199



brother MFC-665CW

Brother MFC-665CW, Colour Inkjet - Flatbed Digital 9 in 1 Multi-Function Centre: Colour Inkjet Printer, Colour Fax, Flatbed Digital Copier, Flatbed Colour Scanner, Photo-Capture Centre, PC-Fax, Speaker Phone, Telephone Hand-set, Answering Machine



\$269

brother MFC-5860CN

MFC-5860CN - 6 in 1 Flatbed Digital Multi-Function Centre is a Colour Inkjet Printer, Fax, Flatbed Digital Copier, Flatbed Colour Scanner, PhotoCapture Centre, PC-Fax, with Up to 35 sheets ADF, 33,600bps (Fax) Modem, Up to 30 ppm Mono, Up to 25ppm Colour.



\$259

brother MFC-7420

The MFC-7420 5-in-1 Laser Multi-Function Centre features a 14.4Kbps fax, 20 pages per minute (ppm) laser printer, and up to 20 copies per-minute convenience copier which combines performance, connectivity and reliability.



\$399

brother MFC-8860DN

Mono Laser - Flatbed Digital 5-in-1 Multi-Function with built in Duplex Scanner and Printer • Up to 50 sheets ADF • Up to 28ppm Print • 32MB RAM Standard Memory, expandable to 544MB • Up to 250 sheets Paper Capacity



\$829

brother HL-2070 Laser

Brother HL-2070N Workgroup personal laser printer, a quality entry-level 20ppm mono laser printer for the Windows or MAC user which offers a 600 x 2400 dpi print resolution and is network ready.



\$259

brother HL-5250DN

Workgroup Laser Printer
Brother HL-5250DN features excellent paper handling with its built-in duplex capability for two-sided printing and very expandable paper input capacity.



\$399

Canon LBP3000/3200

- Mono laser printer, A4 size
- 14 or 18ppm with instant warm up
- Print Resolution: 600 x 600dpi
- Memory: 2MB
- All-in-one cartridge



3000 \$139

3200 \$189

Canon LBP5000/5200

- Machine Type: Colour laser printer
- LBP5000: Up to 8ppm Black & 8ppm Colour, A4; LBP5200: Up to 19ppm Black & 4ppm Colour, A4
- Resolution: 600 x 600 dpi
- Memory: 8MB



5000 \$349

5200 \$399

Canon PIXMA iP4300

- Print Resolution: Up to 9600 x 2400 dpi
- Print Engine: InkJet 5-ink
- Print Speed: Black: Up to 30 ppm, Color: Up to 24 ppm
- Standard DVD/CD Printing, Duplex Printing
- direct digital camera printing



\$149

Canon PIXMA iP5300

- Print Resolution: Up to 9600 x 2400 dpi
- Print Engine: InkJet 5-ink
- Print Speed: Black: Up to 31 ppm, Color: Up to 24 ppm
- DVD/CD Printing, Two Sided Printing
- direct digital camera printing
- Built-in automatic duplex



\$199

Canon PIXMA iP6700D

- LCD Screen: 3.5" (8.9cm) colour LCD, 76,800 pixels and operation panel
- Print Resolution: Up to 9600 x 2400 dpi
- Mono/Color Print Speed: Up to 18/17ppm
- 6 separate ink tanks
- Two Sided Printing
- Interface: USB 2.0
- Hi-Speed, Bluetooth



\$279

Canon Pro9000 A3+

- Resolution: 4800 x 2400 dpi
- Print Speed: Monochrome: approx. 16 ppm, Colour graphics: 15ppm, Photo Paper Pro: approx. 83 seconds
- Paper Size: A3+, A3, A4, A5, B5, B4, LDR+, LDR, Letter, Legal, Envelopes (DL, Com. #10), 5" x 7", 6" x 4"



\$889

Canon IX4000 A3

- Fast A4 document printing at up to 18 ppm black and 14 ppm colour.
- Print photos with approx. 166 secs. for an A3+ (11"x14" image on 13"x19" photo paper)
- maximum 4800 x 1200 dpi for high-quality photos and documents
- Print borderless photos up to A3+
- 4 individual ink tanks



\$479

Canon IX5000 A3

- Fast A4 document printing at up to 25 ppm black and 17 ppm colour
- Print photos with 166 secs. for an A3+ (11"x14" image on 13"x19" photo paper)
- maximum 4800 x 1200 dpi for high-quality photos and document
- Print borderless photos up to A3+
- 4 individual ink tank



\$639

Canon MP180

- Photo quality: max. 4800x1200dpi
- Click-Connect-Print
- Print from compatible memory cards
- Copy/scan thick original
- Smart Copying
- Long lasting photos



\$89

Canon MP460

- Precision ink nozzles create high resolution photos—up to 4800 x 1200 color dpi.
- 1.9" color LCD display
- Print from compatible memory cards
- Print wirelessly
- High-quality scans
- Smart copying



\$129

Canon MP510

- Print directly from compatible digital cameras, memory cards or mobile phones
- huge 1.9 inch colour LCD screen
- high-definition at up to 4800 x 1200 dpi
- Print and copy at up to 25 ppm black and 17 ppm colour
- 4 individual ink system



\$149

Canon MP530

- Print up to 29ppm black and 19ppm colour
- High-speed 6" x 4" photo prints in approx. 51 seconds
- 9600 x 2400 dpi print resolution for outstanding photos and documents
- High-speed fax allows storage of up to 150 incoming pages
- 2-Way Paper Feed



\$319

Canon MP600/ 600R

- Print, Scan, Copy, Camera, Memory Card, and Mobile phone direct printing with 6.3cm Colour TFT screen, 5 separate ink tanks
- Print: Up to 15ppm Mono and 12ppm Color
- Two Sided Printing



600R: Wireless

600 \$239

600R \$359

Canon Canon MP830

- All-in-One colour print, fax, copy & scan
- Print up to 30ppm mono, 24ppm colour
- Super G3 Fax
- 35-page auto duplex ADF
- Two paper trays, Duplex & DVD/CD print
- Max 9600x2400dpi printing
- 2400dpi scanning
- Direct photo printing



\$429

Canon MP810

- Functions: Print, Scan, Copy, Camera, Memory Card, 35mm film/slide and Mobile phone direct printing, 3" TFT Display
- Print Engine: InkJet 5-ink
- DVD/CD & Duplex Printing
- Scanner: Flat-bed CCD colour scanner



\$329

Canon MP960

- All-in-One Photo Printer with 3.5" TFT Display and Easy-Scroll wheel.
- Print and copy at up to 30 ppm black and 22 ppm colour
- 7 individual ink tanks for 6 colour photo printing
- Includes Film Adapter Unit



\$479

Canon MF4140

- Canon MF4140 Laser Printer, Fax, Scanner, Digital Copier Multifunction:
- Laser copy quality (20cpm, 600 x 600 dpi)
- High print resolution (20 ppm1, 600x600 dpi) • 32MB SDRAM
- CD scanning at 1200 x 2400 dpi
- fax memory of up to 250 pages



\$319

Canon MF4150

- Canon MF4150, Laser printer, Fax, Scanner, and Digital Copier all-in-one:
- Laser copy quality (20cpm, 600 x 600 dpi)
- High print resolution (20 ppm, 600x600 dpi)
- CD scanning at 1200x2400 dpi • fax memory of up to 250 pages • 64MB SDRAM



\$429

EPSON CX3900

- 4 Colour Multifunction Inkjet Printer
- Print Speed: 23ppm (black), 12ppm (colour)
- Print Resolution: 5760 Optimised dpi
- Scan Speed: Mono up to 5m sec & Colour up to 15m sec / line at 600dpi • Copy Speed: Black text memo (A4) Approx 5.3 sec



\$89

EPSON CX5900

- 4 Individual Ink Cartridges, 2" LCD
- Print Speed: 27ppm (black), 27ppm (colour)
- Print Resolution: 5760 Optimised dpi
- Scan Speed: Mono up to 5m sec & Colour up to 15m sec / line at 600dpi
- Copy Speed: Black text memo (A4): Approx 27 cpm



\$159

EPSON CX6900F

- 4 Colour Multifunction Inkjet Printer, a powerful and versatile fax, copy, scan and print solution with robust photographic capabilities. • Print Speed: 27ppm (black), 27ppm (colour) • Scan Resolution: 1200 x 2400 dpi • Copy Speed: Black text memo (A4) approx 27 cpm



\$249

EPSON AcuLaser

- C1100 / C1100N**
- Resolution is up to 2400dpi
- 25ppm for mono & 5ppm for colour A4
- 250 sheets (face down tray)
- 32MB with EPSON MiTech
- C1100N: Networking**



\$399/529

EPSON R250

- 4 individual colour ink cartridges
- Up to 20 or 19ppm in black or colour A4 text & 47sec per photo in printing
- High resolution 5760 x 1440dpi Optimised
- True BorderFree photo printing up to A4
- PC-Free Photo Printing Flexibility



\$109

EPSON R390

- Epson R390 A4 Photo printer:
- Print Resolution : 5760 Optimised dpi
- Print Speed : 30ppm black & colour
- 6 individual colour ink cartridges



\$249

EPSON R800

- New UltraChrome Hi-Gloss™ pigment inks
- Up to 17ppm for black text A4 printing
- Print directly on printable CD-R / DVD-Rs
- 5760 Optimized dpi
- 8 individual cartridges



\$479

EPSON Photo 1410

- Print Resolution : 5760 x 1440 Optimised dpi using Resolution Performance Management (RPM) Technology
- Print Speed : Approx. 15 PPM A4 Black & Color
- Print Size: A3+, A3, A4, A5, A6, Letter, B5.



\$569

EPSON RX590

- 6 Colour Multi Functional Inkjet Printer, Scanner and Copier
- Print Speed: Black & Color A4 30ppm
- Resolution : 5760 Optimised dpi
- Scan Resolution : 1200 x 2400 dpi
- 2.5" Epson Photo Fine™ Colour LCD Screen



\$319

EPSON RX650

- 6 Color Multifunction: Printer, Copier, Scanner and Photo features
- Print Speeds of up to 21ppm in black and colour text
- Print directly from a wide range of digital camera memory cards
- 2.5" Photo fine LCD



\$379

Laserjet 1020/1022

- Print: Up to 15 or 19ppm (letter) / 14 or 18 ppm (A4) black
- Up to 1200 dpi effective output quality black
- up to 5,000 or 8,000 pages per month duty cycle



1020 \$159

1022 \$259

1022N \$409

Laserjet P2015

- Prints Up to 26 ppm
- Up to 1200 x 1200 dpi resolution
- up to 15,000 pages per month duty cycle.
- 32MB expandable to 288MB RAM



2015 \$469

2015N \$589

2015DN \$639

Laserjet 1160

- Up to 19 ppm (A4) / 20 ppm (letter), 133 MHz processor, 10 second first page out, 600 x 600 dpi with RET & FastRes (1200 dpi effective output), 16MB RAM, 250-sheet input bin, 10,000 pages/month, USB & parallel interfaces.



\$339

CLJ 2605

- 12ppm black, 10ppm color (A4), first page out - 20 seconds, 300MHz processor, HP ImageREt 2400, 64MB up to 320MB, PCL 6 & Postscript level 3 emulation, input: priority feed tray & 250 sheet tray, 35,000 duty cycle



2605 \$489

2605DN \$669

2605DTN \$899

CLJ2600N

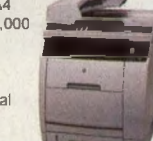
- 600 x 600 dpi with HP ImageREt 2400.
- Print speed: 8 ppm, color and black
- Duty Cycle: Up to 35,000 pages per month
- 16MB Memory
- Network Ready



\$499

CLJ 2840

- HP Color Laserjet 2840 all-in-1 print, copy, scan, fax & Digital Imaging
- Print Resolution: 600x600 dpi, up to 19ppm Black & 4ppm Color A4
- Duty Cycle: Up to 30,000 pages per month
- Memory: 96MB
- Scan resolution: 1200x1200 dpi optical



\$959

Laserjet 3050

- Print: Up to 19 ppm Letter / 18 ppm A4 black; Up to 1200 x 1200 dpi black; Up to 7000 pages per month duty cycle; Scan: Up to 19,200 dpi enhanced & up to 1200 dpi optical; Copy: Up to 19 ppm letter (up to 18 ppm A4).



\$399

Laserjet 3052

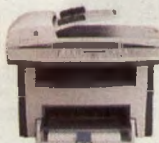
- Print: Up to 19 ppm Letter / 18 ppm A4 black; Up to 1200 x 1200 dpi black; Up to 7000 pages per month duty cycle; Scan: Up to 19,200 dpi enhanced & up to 1200 dpi optical; Copy: Up to 19 ppm letter (up to 18 ppm A4)



\$479

Laserjet 3055

- Print: Up to 19 ppm Letter / 18 ppm A4 black; Up to 1200 x 1200 dpi black; Up to 7000 pages per month duty cycle; Scan: Up to 19,200 dpi enhanced & up to 1200 dpi optical; Copy: Up to 19 ppm letter (up to 18 ppm A4)



\$599

Laserjet M1005

- Laser Print, colour scan, digital copy; M1005 MFP, Print/Copy: Up to 15ppm/cpm letter & 14ppm/cpm A4, 150 sheet input tray & 10 sheet priority feed slot, 32MB RAM, Hi-Speed USB 2.0 port, Scan: up to 1200x1200dpi 24 bit colour (up to 19,200 dpi enhanced)



\$319

Deskjet 1280 A3

- A3+ inkjet with print speed of up to 14 ppm black/11 ppm colour in draft mode, Photoreal III or 4800 x 1200-optimised dpi colour, 5,000 pages per month duty cycle, standard input capacity of 150 sheets, 3 paper paths



\$339

Officejet 6310

- HP Officejet 6310 all-in-1 printer, scanner, copier & fax
- Breakthrough print speed: 30ppm black and 24ppm colour
- Scan: up to 2400 x 4800 dpi
- Duty Cycle: Up to 3000 pages per month



\$259

PSC 5180/ 6180

- Printer/Fax/Scanner/Copier
- Print 32ppm black & 31ppm color; Scan: 4800x4800dpi optical, Fax: 3 secs/page at 33.6kbps, USB & PictBridge, 3000 pages/month, 2.5" or 3.6" LCD



6180: Wireless

\$269/379

CLP300N

- CLP-300N Network Colour Laser Printer, 16 PPM in mono and 4 PPM in colour, with a max resolution of 2400 x 600 dpi, Manual Duplex, includes 150 sheet paper cassette, plus a 100 sheet output tray, Postscript3 and PCL 6 Emulation, Ethernet 10/100 Base TX, USB2.0



\$359

SCX-4200

- Samsung low cost black and white laser printer, Fax & Copy 3 in 1 multifunction
- Print: Up to 18ppm A4, 600x600dpi
- Scan resolution: 600 x 2400 dpi
- LCD: 2 Line x 16 Characters



\$209

SCX-4521F

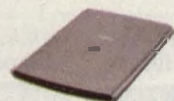
- Laser Multifunction Printer, Copier, Fax, Colour Scanner: Print sharp text and graphics at speeds up to 20 ppm. Fax fast with 3-second scan and 3-second transmission speeds. Fax directly from your PC. Or copy and scan with distinctly professional results.



\$309

Canon Lide70 Scanner

- High quality scanning up to 2400x4800dpi high resolution and 48 bit superior gradation.
- Automatic dust & scratch, fading, graininess correction.
- Four one-touch buttons Scan/Copy/PDF/E-mail.
- Advanced Z-Lid & scanning in the upright position.



\$129

Canon 600F Scanner

- High quality scanning at 4800x9600 dpi.
- 7 EZ buttons allowing you to quickly create a multiple-page PDF file • FARE Level 3, the optimal solution for film scanning.
- Film scanning: 6 frames of 35mm filmstrip (negative/positive)
- One-plug-in startup - No power cord



\$209

Canon 8600F Scanner

- High-resolution scanning up to 4800x9600dpi, 48 bit input/output resolution
- FARE Level 3, the optimal solution for film scanning
- Continuous scanning of up to 12 frames of 35mm filmstrip or 4 mounted slides
- 7 EZ buttons allowing you to quickly create a multiple-page PDF file



\$289

EPSON Perfection V100

- The Epson Perfection V100 Photo sets a new mark for value and style in a desktop scanner. It features an Optical Resolution of 3200x9600dpi, an Optical Density of 3.2 Dmax and Transparency Unit for film scanning.



\$209

EPSON Perfection V350

- A total, high performance and versatile scanning solution for demanding users.
- Optical Resolution : Main 4800 dpi x Sub 9600 dpi • Scanning Speed : Monochrome A4 300dpi : 19 secs; 24bit colour A4 300dpi : 21 secs.



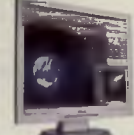
\$289

EPSON Perfection V700

- Super Res. Lens for 6400 dpi film scan
- Remove dust and scratches with DIGITAL ICE™ Technologies
- Excellent tone reproduction with 4.0 DMax optical density
- Scan film of up to 8x10"
- USB 2.0 and IEEE 1394 connection



\$719

Model	19" Acer AL1916WD	22" Acer AL2216WD	24" Acer AL2416WD	17" BenQ FP71G+	19" BenQ FP91G+	19" BenQ FP92W	22" BenQ FP222W	24" BenQ FP241W
								
View Angle	150H/135V	170/160	178/178	140/130	140/130	150/140	170/160	178/178
Contrast ratio	700:1	700:1	1000:1	500:1	550:1	700:1	700:1	1000:1
Brightness	300cd/m ²	300cd/m ²	500cd/m ²	260cd/m ²	250cd/m ²	300cd/m ²	300cd/m ²	500cd/m ²
Response Time	5ms	5ms	6ms	8ms	8ms	5ms	5ms	16ms
Resolution	1440x900	1680x1050	1920x1200	1280x1024	1280x1024	1440x900	1680x1050	1920x1200
Price	\$269	\$399	\$889	\$239	\$279	\$269	\$399	\$1099
Model	17" LG L1719S	19" LG L1919S	19" LG 1953T	19" LG L194WT	20" LG L204WT	15" LG 1510BF Touch	19" Asus VW192G	22" Asus MW221U
								
View Angle	160H/160V	160/160	170/170	160/160	160/160	160/140	160/160	170/160
Contrast ratio	1400:1	1400:1	2000:1	2000:1	2000:1	450:1	800:1	700:1
Brightness	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	250cd/m ²	330cd/m ²	300cd/m ²
Response Time	8ms	8ms	5ms	5ms	5ms	16ms	5ms	2ms
Resolution	1280x1024	1280x1024	1280x1024	1440x900	1680x1050	1280x768	1440x900	1680x1050
Price	\$239	\$269	\$279	\$279	\$339	\$629	\$329	\$479
Model	19" Chimei CMV-946D	22" Chimei CMV-221D	17" Philips 170S7FB,FS	19" Philips 190S7FB, FS	19" Philips 190B7FB, FS	19" Philips 190CW7CS	17" Samsung 740N	17" Samsung 740B
								
View Angle	160/140	170/160	160/160	176/160	176/160	170/160	160/160	160/160
Contrast Ratio	600:1	800:1	600:1	700:1	700:1	850:1	600:1	600:1
Brightness	330cd/m ²	330cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²
Response Time	2ms	5ms	8ms	8ms	8ms	5ms	8ms	8ms
Resolution	1440x900	1680x1050	1280x1024	1280x1024	1280x1024	1440x900	1280x1024	1280x1024
Price	\$259	\$379	\$239	\$279	\$359	\$269	\$249	\$279
Model	19" Samsung 931C	19" Samsung 971P	19" Samsung 940N	19" Samsung 940B	19" Samsung 940BW	20" Samsung 206BW	21" Samsung 215TW	22" Samsung 226BW
								
View Angle	160/160	178/178	160/160	160/160	160/160	160/160	178/178	160/160
Contrast Ratio	2000:1	1000:1	700:1	700:1	500:1	600:1	1000:1	700:1
Brightness	250cd/m ²	250cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	280cd/m ²
Response Time	2ms	6ms	8ms	8ms	4ms	6ms	8ms	5ms
Resolution	1280x1024	1280x1024	1280x1024	1280x1024	1440x900	1680x1050	1680x1050	1680x1050
Price	\$369	\$399	\$279	\$349	\$289	\$399	\$639	\$489
Model	17" Viewsonic VA703B	19" Viewsonic VA1912W	19" Viewsonic VA903B	19" Viewsonic VG1930WM	20" Viewsonic VG2021M	20" Viewsonic VG2030WM	22" Viewsonic VX2235WM	22" Viewsonic VX2245WM
								
View Angle	150/135	150/130	150/135	150/135	150/130	160/160	170/160	150/140
Contrast Ratio	700:1	500:1	700:1	700:1	500:1	800:1	700:1	700:1
Brightness	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	300cd/m ²	280cd/m ²	280cd/m ²
Response Time	8ms	8ms	8ms	5ms	8ms	5ms	5ms	5ms
Resolution	1280x1024	1440x900	1280x1024	1440x900	1400x1050	1680x1050	1680x1050	1680x1050
Price	\$229	\$269	\$269	\$299	\$309	\$359	\$429	\$439

MP3 Player

SanDisk Sansa

- Sleek, thin design with large 1.8" TFT color screen
- Strong alloy metal casing
- User replaceable and rechargeable Lithium Ion battery
- Digital FM tuner



2GB E250 \$179
4GB E260 \$229
8GB E280 \$289

FunTwist 2GB 325 / 328

FunTwist D-Chord 325 or 328 MP3/WMA/WAV Player, 2GB Memory, Black or Silver color. Large 1.8" Color TFT LCD, 10 hours Playback Time, Support JPEG/Movie Play, Digital Voice/FM Recorder



\$109

i-Rocks MP3 FM Transmitter

By plugging in your USB flash drive or MP3 player (or any audio source with an audio output) into the i-Rocks IR-1110 MP3 DJ FM Transmitter - Silver and then tuning to the specified FM channel, you can immediately enjoy listening to your favourite digital music over your car stereo.



\$59

Kaiser Baas Digital Photo Frame

Show all your digital photos as slideshows with background music: • Easy-to-use menu screen with onboard buttons • 32MB memory • Adjustable leg length • Rotate, Zoom, Set Slideshow Duration • Wall mount hole & tripod screw hole • Infra-red remote control



8" \$299
10" \$349

Projectors

EPSON EMP-S4

- 1500 ANSI lumens (Low Brightness mode)
- Contrast 500:1
- Dimensions : 327mm(W) x 247mm(D) x 99mm(H)
- Weight : 2.6kg



\$929

EPSON EMP-TW20

- High Brightness Mode: 1200 ANSI Lumens (Dynamic)
- Contrast: 1,000:1
- Aspect ratio: 16:9
- Weight: Approx. 3.5kg



\$1299

LG DS125

- Brightness: 2500 ANSI lumens
- Contrast: 2000:1
- Native SVGA(800x600)
- Lamp Life: Normal = 3000hr, Economic = 4000hr
- Ultra Light Weight 1.9Kg



\$999

LG DX125

- Brightness: 2500 ANSI lumens
- Contrast: 2000:1
- Native XGA(1024x768)
- Lamp Life: Normal = 3000hr, Economic = 4000hr
- Ultra Light Weight 1.9Kg



\$1459

BENQ MP510

- Brightness: 1500 ANSI Lumens
- Contrast Ratio: 2000:1
- Lamp Life Up to 2000/3000 hours (Normal/Economic mode)
- Image size: 20" to 200"



\$759

BENQ MP611

- Brightness: 2400 ANSI Lumens
- Contrast Ratio: 2000:1
- Lamp Life Up to 3000/4000 hours (Normal/Economic mode)
- Image size: 31" to 300"



\$999

BENQ MP721C

- Brightness: 2200 ANSI lumens
- Contrast: 2000:1, Aspect ratio: 16:9
- Lamp Life Up to 3000/4000 hours (Normal/Economic mode)
- Image size: 31" to 300"
- Weight 2.67 kg



\$1359

BENQ MP721

- Brightness: 2500 ANSI lumens
- Contrast: 2000:1, Aspect ratio: 16:9
- Lamp Life Up to 3000/4000 hours (Normal/Economic mode)
- Image size: 31" to 300"



\$1699

BENQ CP120 Wireless

- Benq CP120 Native XGA Resolution Built-in wireless connection (802.11a/b/g) 1500 ANSI Lumens 2000:1 contrast ratio 2.91lbs(1.3kg)
- Auto Keystone & Auto Sync with one Touch 3000hrs lamp life(eco mode)



\$1999

TOSHIBA TDP-S35

- Native Resolution: SVGA 800x600
- Projector format: 4 : 3 switchable to 16 : 9
- Brightness: 2000 ANSI Lumens
- Contrast Ratio: 2000:1
- Weight: 3.0kgs



\$1199

TOSHIBA TDP-T9

- Resolution: XGA 1024 x 768 pixels
- Brightness: 2000 ANSI Lumens
- Contrast Ratio: 2000:1
- Remote control with laserpointer



\$1999

acer. XD1170D

- Brightness: 2,300 ANSI Lumens (STD)
- Contrast Ratio: 2000:1
- Native Resolution: 800 x 600 (SVGA)
- Dimension: 230 x 238 x 123 mm
- Weight: 2.2kg



\$999

SONY VPLCS21

- 3LCD technology
- Stylish design - slimmest in the market
- 2100 ANSI Lumens
- Light weight of 1.9kg
- SVGA (800 x 600)



\$1599

SONY VPLCX21

- 3LCD technology
- Stylish design - slimmest in the market
- 2100 ANSI Lumens
- XGA (1024 x 768) resolution
- Light Weight of 1.9kg



\$2199

SONY VPLES3W

- 3LCD technology
- 2000 ANSI Lumens
- Quiet Operation, as low as 29dB
- SVGA (800 x 600)



\$1299

acer. PD323

- Brightness: 1,700 ANSI Lumens
- Contrast Ratio: 2000:1
- Native Resolution: 1024 x 768 (SVGA)
- Dimension: 216x169x62mm
- Weight: 1.3kg only



\$1799

Joy Stick

Harmony 525

- With instant access to an internet-based worldwide database of infra-red codes, you can control all devices from all manufacturers, including HDTV, satellite and cable boxes.



\$109

Harmony 785

- Harmony 785 Advanced Universal Remote • Simple one-touch activity control • Replaces up to 15 remote controls • Large and clear colour LCD display • Long lasting rechargeable battery



\$249

Harmony 1000

- Logitech® Harmony® 1000 Advanced Universal Remote, the latest and most intelligent evolution of simple, 3.5" color one-touch fingertip control.



\$449

Microsoft Xbox360 Controller

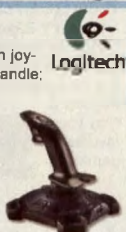
- the Xbox 360 Controller for Windows delivers a consistent and universal gaming experience across both of Microsoft's gaming systems.



\$59

Attack3

- The entry level eight button joystick with a versatile grip handle; includes throttle control.



\$29

Extreme 3D Pro

- Premium twist handle joystick with a modern design for maximum comfort and control.



\$45

Momo Racing Force Feedback Wheel

- With a full rubber wheel and a stick shift, this MOMO designed Force Feedback wheel turbocharges your driving experience.



\$135

G25 Racing Wheel

- The G25's unique dual-motor force feedback transmission delivers powerful, high-fidelity force effects to the hand-stitched leather wheel, so you can feel under-and-oversteer.



\$379

Media KB Elite

Sleek, Ultra-flat design with Convenient controls, work smarter, communicate better, and have more fun with this Ultra-flat keyboard that offers ergonomic features and a wealth of convenient functions keys.



\$39

G11 Gaming KB

Featuring illuminated characters on every key, the G11 is perfect for marathon flag defense sessions or late-night raids. Use any of the 18 fully programmable G-keys to execute complex macros with a single keypress, and with 3 modes for each key, you can have 54 custom programmed keys per game.



\$89

G15 Gaming KB

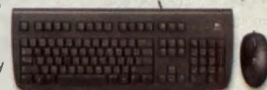
The Logitech® G15 offers gamers in-game information, programmability and control. Its adjustable-tilt, backlit LCD display shows you crucial information during game play, and lets you set timers to keep track of game events.



\$109

Deluxe 250 Desktop

The Logitech® Deluxe 250 Desktop offers a comfortable, conservatively-designed keyboard with drain holes for spill-resistance. The desktop includes the best-selling and equally durable Logitech® Optical Mouse. With a familiar shape and a quality feel—ideal for any user.



\$39

Cordless Desktop EX110

Have the clean, wire-free desk space you've dreamed about. The sleek Logitech® Cordless Desktop® EX 110 makes it incredibly easy and affordable to go cordless—in style.



\$59

Internet 1500 Laser Cordless Desktop

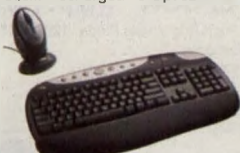
The Internet 1500 Laser Cordless Desktop, the keyboard includes driver free hot keys such as Calculator, Email, Media, Internet and more. The included Laser mouse features 1000 dpi precision with complete power management.



\$69

Rechargeable Cordless Desktop

The Cordless Rechargeable Desktop OEM:
• Logitech Cordless Desktop Optical KB
• Logitech Click! Rechargeable Optical



\$89

Cordless Desktop LX 710 Laser

Maximize your music and photo experience with easy-to-use, one-touch controls for audio playback and image editing. Enjoy superior comfort with soft-touch surfaces, adjustable keyboard angles, and industry-leading durability and reliability.



\$109

Cordless Desktop MX™ 3200 Laser

Working with Windows Vista™, the Cordless Desktop® MX™ 3200 Laser makes it easy to access advanced features. Enjoy ultra-precise navigation with the high-resolution laser mouse, and easy Internet call management with convenient one-touch controls.



\$139

Cordless Desktop MX™ 5000 Laser

The Cordless Desktop MX 5000 Bluetooth Laser, the keyboard's LCD lets you navigate media playlists or online radio stations, view time/date and more while awesome touch-sensitive media controls let you glide to exactly the desired.



\$199

diNovo™ Media Desktop™ Laser

The Logitech® diNovo™ Media Desktop Laser:
• Bluetooth® MediaPad — long range Bluetooth® enabled remote commander
• Rechargeable MX Laser mouse
• Unique, ultra-flat keyframe technology
• Smart power management
• Tilt Wheel Plus Zoom™



\$259

diNovo Edge

An ideal partner for any high-end computer, the ultra-slim Logitech® diNovo Edge™ delivers the ultimate in feel and response. The revolutionary Touch-Disc™ with hyper-speed scrolling and pixel-perfect control makes trackpads obsolete.



\$259

Microsoft® Business Hardware Pack

• Built-in zoom slider—zoom in and out
• "My Favorites" keys—easy access to Web sites and files & Customizable hot keys
• Multimedia center
• Detachable palm rest



\$49

Microsoft® Digital Media Pro Keyboard

It features a new Zoom Slider that lets you zoom in and out of documents and pictures with ease. Customizable My Favorites keys, Media Center, and Hot Keys give you one-touch access to commonly accessed media, programs, and files.



\$49

Microsoft® Natural Ergonomic 4000

The Natural Ergonomic Keyboard 4000 is designed to give you a more natural wrist alignment, letting you work more comfortably. One-touch access to commonly used files and programs enhances productivity.



\$69

Microsoft® Remote KB for WinXP Media Center

Microsoft® Remote Keyboard for use with Windows Media Centre Edition. 3-in-1 keyboard with integrated mouse and remote control. Launch digital media, surf the Web, watch movies, and send instant messages from up to 30 feet away.



\$79

Microsoft® Wireless Optical Desktop 2000

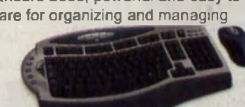
The Microsoft® Wireless Optical Desktop 2000 features a compact Comfort Curve keyboard that lets your hands rest naturally and comfortably.



\$69

Microsoft® Wireless Optical Desktop 5000

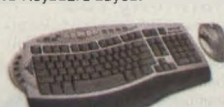
Enjoy better photos with this all-in-one photo editing solution—photo keyboard, mouse and software all-in-one. Includes Microsoft® Digital Image Standard 2006, powerful and easy to use software for organizing and managing photos.



\$79

Microsoft® Wireless Laser Desktop 6000

Microsoft® Wireless Laser Desktop 6000 features: High Definition Laser Technology, Wireless Freedom, Magnifier, Zoom Slider, Comfort Curve Keyboard Layout



\$109

Microsoft® Wireless Entertainment Desktop 7000

This ultra-thin entertainment desktop set with rechargeable mouse delivers on/off desk top-notch performance with virtually no interference—from up to 30 feet away.



\$199

Razer Tarantula Tournament Ed. Gaming KB

32kb onboard memory (up to 5 customizable profiles), 10 programmable hot keys, on-the-fly gaming profile activation, Fully interchangeable keys to allow different key placement around the board, Media center keys to control media programs



\$139

Zboard Gaming Keyset



\$39

Wolf Claw Devour Gaming Pad

• Total 55 keys in Ergonomic layout.
• Onboard Volume Control and Esc keys.
• Sturdy and Solid Base.
• High quality and Splash Proof Casing.
• 3 Layer Silicon for Quiet Key Typing
• 10 Million Key Press Life Span



\$59

Zboard USB Gaming Keyboard

A Zboard™ Base has an auto recognition feature for any keyset you insert. There's no need to install any additional software. It is the brain behind the brawn. Just switch Keysets & Play your favorite games.



\$79

LX5 Cordless Optical Mouse

Cordless Freedom made easy. The Logitech LX5 Cordless Optical Mouse installs effortlessly and features smart power management for up to 8 months of battery life. Tilt wheel plus zoom is perfect for viewing digital photos and spreadsheets. Battery indicator light.



\$39

LX7 Cordless Optical Mouse

Logitech LX7 Cordless Optical Mouse, the soft-touch rubber grip provides natural comfort, and the wireless mini-receiver installs effortlessly and eliminates clutter. Smart power management extends battery life up to 8 months.



\$59

G3 Laser Mouse

- Full-speed USB at 500 reports/second
- 2000 dpi gaming-grade laser engine
- Built for long gaming sessions
- Precise, fingertip control design
- Sensitivity switching on-the-fly
- Polytetrafluoroethylene gaming feet



\$59

G5 Laser Mouse

Logitech G5 Laser Mouse features: PC • Optical • USB • Scroll wheel • Application Switch • Tilt Wheel Plus Zoom™ • Right-Handed Comfort Grip • Laser Technology



\$89

G7 Laser Cordless Mouse

Logitech G5 Laser Mouse features: PC • Cordless • USB • Scroll wheel • Application Switch • Tilt Wheel Plus Zoom™ • Right-Handed Comfort Grip • Rechargeable • Laser Technology



\$119

MX400 Laser

The contoured shape and soft rubber grip make using the MX-400 effortless, while advanced laser technology provides ultra-precise tracking on almost any imaginable surface, including those that resist optical mice.



\$49

MX™ Revolution

Smarter, faster, and fully-loaded, Logitech's innovative MicroGear™ Precision Scroll Wheel lets you fly through long documents at hyperspeed, or switch to precise click-to-click scrolling for navigating lists, slides, and image collections.



\$129

VX Revolution

Logitech VX Revolution, the ultimate notebook mouse. Logitech's innovative MicroGear™ Precision Scroll Wheel lets you fly through long documents at hyperspeed, or switch to precise click-to-click scrolling to navigate lists, slides, and image collections.



\$79

V200 Cordless for Notebook

V200, 2.4GHz digital cordless, provides longer range and delivers interference-free operation. The 2.4GHz micro-receiver snaps into the mouse for easy transport and turns it off for power efficiency.



\$59

V450 Laser Cordless for Notebooks

Logitech® V450 Laser Cordless Mouse for Notebooks. Laser precision, ergonomic comfort. Redefining mobile performance with laser tracking, a comfortable design, and up to a year of battery life.



\$65

V270 Cordless Optical Notebook for Bluetooth

More comfortable than a touch pad and just as convenient, the V270 instantly connects to notebooks enabled with Bluetooth wireless technology, providing up to 10m of cordless range. It is also compatible with Apple PowerBooks.



\$69

Microsoft® Habu™ Laser Gaming Mouse

Microsoft Habu Laser Gaming Mouse unites legendary Microsoft comfort with the latest in Razer precision. It features:

- Ergonomic design
- Wheel scrolling
- USB connector
- Customizable buttons



\$119

Microsoft® Wheel Optical

Wheel Mouse Optical replaces the old-fashioned mechanical mouse ball, allowing you to work on virtually any surface. With a convenient scroll wheel and comfortable design, Wheel Mouse Optical is a great value.



Beige/Black

\$25

Microsoft® IntelliEye Optical Mouse

Microsoft's IntelliMouse Optical features silver detailing. Microsoft's signature glowing red underside and tailgrip, and ergonomic enhancements to provide comfort for left- and right-handed users.



\$29

Microsoft® Explorer Optical Mouse

Microsoft IntelliMouse Explorer with Tilt Wheel Technology changes the way you scroll – now you can scroll horizontally as well as vertically – making it faster and easier to move through documents and web pages.



\$39

Microsoft® Standard Wireless Optical Mouse

Turn your desktop into a vibrant, clutter-free space with the Wireless Optical Mouse. Wireless technology, a wider, clear scroll wheel, and signature red optical glow combine in a fun design.



\$39

Microsoft® Wireless Notebook Optical Mouse 4000

Travel in comfort and control with the Microsoft Notebook Optical Mouse 4000. Get greater control with Tilt Wheel Technology for 4-way scrolling and Magnifier for enlarging screen details. Plus, prolong battery life with the Snap-in Receiver that automatically turns off the mouse.



\$49

Microsoft® Wireless Notebook Laser Mouse 6000

Unprecedented control in a High Definition, wireless notebook laser mouse. For the control you'd expect from a desktop mouse, plus the superior performance, precision, and power of High Definition Laser Technology, select the Microsoft Wireless Notebook Laser Mouse 6000.



\$89

Microsoft® Laser Mouse 6000

- Microsoft laser mouse 6000 offers better accuracy and smoother tracking
- Laser Technology
- Precision Booster and Gaming Toggle
- Magnifier
- Longer cord
- Scroll wheel with detents



\$59

Microsoft® Wireless Laser Mouse 6000

- Microsoft Wireless laser mouse 6000 offers better accuracy and smoother tracking
- Wireless Freedom
- Scroll Wheel
- Ergonomic Design
- 4-Way Scrolling
- Customizable Buttons
- Sophisticated Finish



\$89

Microsoft® Remote Control and Receiver for Media Center PC

A Media Center compatible remote control that keeps all of the entertainment on the computer within easy reach and complements the keyboard and mouse



\$59

RAZER Krait Infrared Gaming Mouse

Razer Krait Infrared High Precision Gaming Mouse with Orange LED, 3-Buttons independently programmable, 1600 DPI, USB 2.0, Ambidextrous design, 6400 frames per second 16 bit data path, High speed motion detection.



\$49

RAZER Diamondback

Razer Diamondback Infrared Optical Precision Gaming Mouse, 7-Buttons independently programmable, 1600 DPI high performance sensors, 6400 frames per second, 16 bit data path, High speed motion detection, Ultra large non-slip mouse buttons, rubber side rails for improved grip, Always On Mode, Chameleon/ Green/ Plasma/ Salamander available.



\$69

RAZER Copperhead

Razer Copperhead Infrared High Precision Gaming Mouse with Blue LED, 7 Hyper-response Buttons independently programmable, 2000 DPI high performance sensors, 1ms Response Time, 32KB Onboard Memory, up to 3 Customizable Weights, 16 bit data path, High speed motion detection, Ultra large non-slip mouse buttons with Hyperresponse, Always On Mode, Blue or Red Color.



\$89

Canon A450

- 5.0 Megapixel
- 3.2x optical zoom lens
- Super fast DiGIC II Imaging Processor
- 2.0" LCD Screen
- Movie recording and play-back



\$169

Canon A550

- 7.1 Megapixel
- 4x optical zoom lens.
- DiGIC II Imaging Processor
- 2.0" LCD Screen
- Movie recording and play-back with sound.



\$239

Canon A560

- 7.1 Megapixels
- 4x optical zoom lens.
- Face Detect with Auto Focus, Auto Exposure, Flash Exposure and in camera red-eye correction
- 2.5" LCD Screen



\$309

Canon A570is

- 7.1 Megapixels
- 4x optical zoom lens.
- DiGIC III and Image Stabilizer
- 2.5" LCD Screen



\$369

Canon A630

- 8.0 Megapixels
- 4x optical zoom
- 2.5" vari-angle LCD screen
- DiGIC II
- 21 Shooting Modes



\$359

Canon A640

- 10.0 Megapixels
- 4x optical zoom
- 2.5" vari-angle LCD screen
- DiGIC II
- 21 Shooting Modes



\$449

Canon A710is

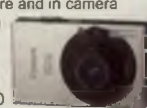
- 7.1 Megapixels
- 6x Optical zoom
- Optical Image Stabilizer
- 2.5" LCD Screen
- DiGIC II



\$409

Canon IXUS70

- 7.1 Megapixels.
- 3x optical zoom lens.
- DiGIC III Imaging Processor
- Face Detect with Auto Focus, Auto Exposure, Flash Exposure and in camera red-eye correction
- Large 2.5 LCD



\$409

Canon IXUS75

- 7.1 Megapixels.
- 3x optical zoom lens.
- DiGIC III Imaging Processor
- Face Detect with Auto Focus, Auto Exposure, Flash Exposure and in camera red-eye correction
- Large 3.0 LCD



\$439

Canon IXUS 800is

- 6.0 Megapixel
- Canon 4x optical zoom lens with Optical Image Stabilizer.
- Huge 2.5 inch LCD



\$479

Canon IXUS 850is

- 7.1 Megapixel.
- Canon 3.8x optical zoom
- 28mm wide lens.
- Huge 2.5 inch LCD screen.



\$559

Canon IXUS 900 Ti

- 10.0 Megapixels.
- Striking Titanium body
- Canon 3x optical zoom
- Huge 2.5 inch LCD screen.



\$559

Canon IXUS i7

- 7.1 Megapixel.
- Canon 2.4x optical zoom lens.
- Choice of 4 fashionable colours
- 1.8 inch LCD screen.



\$359

Canon G7

- 10.0 Megapixels.
- Canon 6x optical zoom lens with Optical Image Stabilizer.
- Huge 2.5 inch LCD screen.
- Full manual controls



\$709

Canon TX1

- 7.1 Megapixel.
- 10x optical zoom lens with Optical Image Stabilizer
- High definition movie with stereo sound.
- DiGIC III Imaging Processor



\$569

Panasonic DMC-FX10

- 6.0 Megapixel
- 3x optical zoom with MEGA OIS, 2.5" LCD screen
- Record stunning movies in wide VGA 848x480
- Long battery life. Up to 350 shots



\$369

Panasonic DMC-FX12

- 7.2 Megapixel
- 3x optical zoom with MEGA OIS, 2.5" LCD screen.
- Record stunning movies in wide VGA 848x480
- Long battery life. Up to 350 shots.



\$429

Panasonic DMC-FZ8

- 7 Megapixel Effective
- 12x Optical/4x Digital Zoom
- 2.5 inch Large Bright LCD
- Dual Image Stabilisation
- 27MB built-in memory



\$559

Panasonic DMC-FZ50

- 12x Optical Zoom Leica DC Lens
- 10.1 Effective Megapixels
- Intelligent Image Stabiliser
- Venus Engine III



\$779

Panasonic DMC-LZ7

- 7.0 Megapixel Camera.
- 6x Optical, 4x Digital Zoom.
- MEGA Optical Image Stabiliser (clearer images).
- Records video 848x480 @ 30fps with sound
- 2.5" LCD Monitor



\$399

Panasonic DMC-TZ3

- 7.2 Megapixel Effective
- 10x Optical Zoom, 4x Digital Zoom
- 28-280mm OIS Lens
- 3.0" LCD



\$649

OLYMPUS FE210

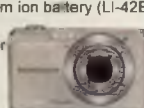
- 3x optical zoom
- One button, one function design principle
- Shakeproof anti-blur mode
- Large 2.5" LCD screen
- 15 scene modes



\$189

OLYMPUS FE220

- 3x optical zoom
- Slim metal body
- Shakeproof anti-blur mode.
- Large 2.5" LCD screen.
- Movie mode with sound.
- Lithium ion battery (LI-42B) and charger



\$269

OLYMPUS FE240

- 5x Optical Zoom lens
- Slim-line metal case.
- Movies w/sound 640x480 @ 30fps
- Large 2.5" LCD screen.
- Lithium ion battery (LI-42B) and charger



\$359

OLYMPUS SP510

- Battery life up to 630 shots
- Shakeproof
- Nightproof
- 7.1 Megapixels
- 10x Optical Zoom
- High Light Sensitivity



\$399

OLYMPUS SP550

- 18x Optical Zoom
- Wide angle lens (equiv. 35mm) 28 - 504mm
- Dual Image Stabilization
- High burst rate (up to 15fps at 1.2 Megapixel)
- Super Macro mode



\$699

OLYMPUS MJU770

- Waterproof to 10M and Shock Proof up to 1.5M.
- Freezeproof up to -10°C.
- Crushproof up to 100kg
- Tough metal body.
- 2.5" LCD screen



\$529

SONY DSC H2

- 6 Megapixel CCD
- 12x Optical Zoom / 24x Precision Digital Zoom
- 2.0" Colour LCD
- 30MB Internal Memory.
- Memory Stick PRO compatible



\$549

SONY DSC H7

- 8.1 Megapixel CCD
- 15x Optical Zoom / 24x Precision Digital Zoom
- 3.0" Colour LCD
- 30MB Internal Memory.
- Memory Stick PRO compatible



\$599

SONY DSC H9

- 8.1 Megapixel CCD
- 15x Optical Zoom / 24x Precision Digital Zoom
- 3.0" Free angle Clear Photo LCD



\$699

SONY DSC N2

- 10.1 Mega Pixel CCD
- 3X Optical Zoom
- 3.0" Touch Screen, Hybrid Clear Photo LCD Plus
- Slide show with Music & Effects



\$649

SONY DSC S650

- 7.2MP Camera
- 3 x Optical Zoom
- 24mb internal Memory
- 2" Colour LCD
- Memory Stick Duo & Pro Duo compatible.



\$239

SONY DSC S700

- 7.2MP Camera
- 3 x Optical Zoom
- 24mb internal Memory
- 2.4" Colour LCD
- Memory Stick Duo & Pro Duo compatible.



\$269

SONY DSC T20

- 8.1 Effective Mega Pixels
- 3X Optical Zoom with Optical Image Stabiliser
- Full HD 1080i Output
- 2.5" Clear Photo LCD Plus screen



\$529

SONY DSC T100

- 8.1 Effective Mega Pixels
- 5X Optical Zoom / Full Metal Body
- Full HD 1080i Output
- 3.0" Hybrid LCD screen.



\$659

SONY DSC W35

- 7.2 Megapixel
- 3 x Optical Zoom, 58mb internal memory
- Carl Zeiss Vario-Tessar lens
- 2" LCD. Memory Stick Duo & PRO Duo compatible.



\$359

SONY DSCW55

- 7.2 Megapixel
- 3 x Optical Zoom, 58mb internal memory
- Carl Zeiss Vario-Tessar lens
- 2.5" LCD. Memory Stick Duo & PRO Duo compatible.



\$399

SONY DSCW80

- 7.2 Megapixel
- 3 x Optical Zoom
- Full Metal Body
- Carl Zeiss Vario-Tessar lens
- 2.5" LCD. Memory Stick Duo & PRO Duo compatible.



\$479

SONY DSCW100

- 8.1 Megapixel CCD
- 3x Optical Zoom
- 2.5" Colour LCD
- 64mb internal Memory
- Stamina: 360 shots/ 180mins



\$499

Canon MD120

- Powerful Canon 35x zoom lens, includes Canon Image Stabilisation for smooth shake free films
- 800k pixel CCD and DIGIC DV for outstanding image quality



\$389

Canon MD160

- Powerful Canon 35x zoom
- High resolution 1.07M pixel CCD and DIGIC DV
- Ultra fast QuickStart less than 0.7seconds • 2.7" Widescreen LCD • Night Mode LED & Wireless Remote Control



\$539

Canon DC40

- 4.29 Megapixel CCD
- Direct-to-DVD shooting
- High resolution genuine Canon 10x zoom lens.
- RGB Colour Filter & DIGIC DV Processor
- Real 16.9 Widescreen recording
- DVD movie making software included.



\$1079

Canon DC210

- Powerful Canon 35x zoom
- 800k pixel CCD and DIGIC DV II • QuickStart • Real Widescreen recording and 2.7" Widescreen LCD



\$549

Canon DC220

- Powerful Canon 35x zoom
- 800k pixel CCD and DIGIC DV II • Ultra fast QuickStart < 0.7seconds • Real Widescreen recording and 2.7" Widescreen LCD



\$589

Canon DC230

- Powerful Canon 35x zoom • 1.07M pixel CCD and DIGIC DV II • QuickStart • Real Widescreen recording and 2.7" Widescreen LCD • Night Mode LED & Wireless Remote Control



\$629

Canon DC22

- Supports dual layer DVD's
- 2.2 Megapixel CCD for high quality photos and video
- High resolution genuine Canon 10x zoom lens
- Real 16.9 Widescreen recording



\$799

Panasonic NV-GS60

- Powerful 30x Optical Zoom
- Features Quick Start for those special moments
- Colour Night View for shooting in dim light
- 2.5" LCD Screen



\$479

Panasonic NV-GS230

- 3CCD Camera System
- 2.3 Megapixel Still Picture Recording with Simultaneous Motion Video, 10x Optical Zoom
- 2.5" LCD Screen



\$799

Panasonic VDR-D160

- 30x Optical Zoom
- Pure Colour Engine
- Support Multi-Format Recording (DVD-RAM, DVD-R, DVD-RW)
- Joystick control
- Simple, one-handed operation



\$569

Panasonic VDR-D220

- 3CCD Camera System
- 2.3 Megapixel Still Picture Recording
- 10x Optical zoom
- Multi-Format Recording
- 2.7 inch LCD Screen



\$659

Panasonic VDR-D310

- 3CCD Camera System
- Multi-Format Recording
- Optical Image Stabiliser
- Leica Dicomar Lens
- 10x Optical Zoom



\$999

SONY MiniDV DCRHC38

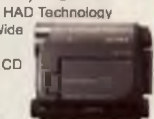
- 40x Optical 80x / 2000x Digital
- Carl Zeiss Vario-Tessar Lens
- 1/6" (3mm) CCD with Advanced HAD Technology
- 2.5" Touch Panel LCD Screen



\$469

SONY MiniDV DCRHC48

- 25x Optical 50x / 2000x Digital zoom with wide angle setting
- Carl Zeiss Vario-Tessar Lens
- 1/6" (3mm) CCD with Advanced HAD Technology
- 2.7" Wide Touch Panel LCD Screen



\$599

SONY DCRHC96

- 10X Optical/120X Digital Zoom
- Professional Quality Carl Zeiss Vario-Sonnar Lens
- 2.7" Wide Hybrid LCD Screen
- 1/3" 3.3 Mega Pixel CCD
- SteadyShot Picture Stabilization System



\$859

SONY DCRSR42

- 30GB Hard Disk Drive
- 40x Optical zoom, 2.5" 4.3 LCD Touch Screen, Record in 4:3 or 16:9 aspect ratio, Carl Zeiss Vario-Tessar Lens, includes Handycam Station



\$859

SONY DCRSR62

- 30GB Hard Disk Drive
- 25x Optical zoom, 2.7" 16:9 Wide LCD Touch Screen, Record in HQ 16:9, Carl Zeiss Vario-Tessar Lens



\$999

SONY DCRDVD608

- Record Direct to DVD
- DVD+RW/-RW /+R DL Recording Formats
- 1/6" (3mm) 960H CCD with Advanced HAD Technology
- 40x Optical / 80x/2000x Digital Zoom
- 2.5" Touch Screen LCD



\$639

SONY DCRDVD708

- Record Direct to DVD
- DVD+RW/-RW /+R DL Recording Formats
- 1/6" (3mm) 960H CCD with Advanced HAD Technology
- 25x Optical / 24x/480x Digital Zoom
- 2.7" Touch Screen LCD



\$749

SONY DCRDVD808

- Record Direct to DVD, DVD-RW/-RW format
- 10X Optical/20X/120X Digital
- 2.7" Wide Touch Screen
- 4.0 Megapixel



\$999

SONY DCRDVD908

- 10x Optical / 20x/120x Digital Zoom
- Dolby Digital 5.1 Channel Recording, Dolby Digital 2 Channel Recording
- 6.1 Mega Pixel Still Image Capture



\$1199

Camera Media

XD Card

512MB / 1GB / 2GB XD Card **\$39/59/79**

Compact Flash Card

1GB / 2GB / 4GB Compact Flash **\$39/59/89**
1GB / 2GB / 4GB Sandisk UltraII Compact Flash **\$39/69/99**
1GB / 2GB Sandisk ExtremelII Compact Flash **\$59/89**

Secure Digital Card

512MB / 1GB / 2GB / 4GB Secure Digital **\$19/29/39/69**
512MB / 1GB / 2GB Mini Secure Digital **\$19/29/39**
512MB / 1GB / 2GB Sandisk Secure Digital **\$25/35/49**
1GB / 2GB Sandisk Mini Secure Digital **\$35/49**
1GB / 2GB / 4GB Sandisk UltraII Secure Digital **\$39/59/99**
1GB / 2GB Sandisk Transflash Micro Secure Digital **\$39/59**

Memory Stick Card

1GB / 2GB / 4GB Sandisk Memory Stick Pro Duo **\$49/69/129**
4GB Sandisk Memory Stick Pro Duo UltraII **\$179**

Camera Accessory

Canon Camera Accessories

Canon AC Power Adaptor ACK500/ 600/ 800/ 900 **\$99**
Canon Battery Charger NB1LH/ NB2LH / NB3L/ NB4L/ NB5L **\$79**
Canon Camera Case SCDC20 / SCDC40/ SCPS600 **\$49**
Canon Water Proof Case WPDC80 / WPDC90 **\$269**
Canon Wide Lens Converter WDH27/ WDH34/ WDH37 **\$229**
Canon Tele-Converter Lens TCDC52/ TCDC58 **\$189**

Panasonic Camera Accessories

Panasonic AC Power Adaptor DMW-CAC1 **\$139**
Panasonic Battery CGA-002E **\$99**
Panasonic Marine Case DMW-MCFX01E / DMW-MCTZ1E **\$459**

Sony Camera Accessories

Sony AC Power Adaptor ACLS5K **\$79**
Sony Infolithium Rechargeable Battery NPFC11/ NPFE1 **\$99**
Sony Soft Carry Case LCSCP2 / LCSSA **\$49**
Sony Sports Pack for Mini DV & DVD Handy SPKHCB **\$369**

Targus 3-in-1 Bag/ Tripod/ 14-in-1 reader +3port Hub **\$49**

Canon Cartridges



Canon BCI-21BK	\$15
Canon BCI-21C	\$25
Canon BCI-24BK	\$15
Canon BCI-24C	\$25
Canon BCI-3EBK	\$15
Canon BCI-3EC,3EM,3EY	\$19
Canon BCI-3EPBK,PC,PM	\$19
Canon BCI-6BK	\$18
Canon BCI-6C,6Y,6M,6G,6R	\$18
Canon BCI-6PC,6PM	\$18
Canon CL41	\$35
Canon CL51	\$49
Canon CLI-8BK	\$23
Canon CLI-8C, 8Y,8M	\$23
Canon CLI-8PC,8PM	\$23
Canon PG-40	\$35
Canon PG-50	\$42
Canon PGI-5BK	\$25
Canon CART301BK	\$139
Canon CART301C,Y,M	\$149
Canon CART303	\$99
Canon CART307BK	\$99
Canon CART307C,Y,M	\$109
Canon CART308	\$99
Canon CART308II	\$169
Canon CARTU	\$109
Canon EP22	\$89
Canon EP25	\$89
Canon EP26	\$109
Canon FX9	\$129



Samsung Cartridges

Samsung 1710D3	\$99
Samsung 2010D3	\$99
Samsung 4100D3	\$109
Samsung 4216D3	\$99
Samsung D4200A	\$109
Samsung 4521D3	\$109
Samsung 6060D6	\$159
Samsung 300BK	\$89
Samsung 300C,Y,M	\$79
Samsung 500D5C,Y,M	\$149
Samsung 500D7K	\$139
Samsung 510D5C,Y,M	\$149
Samsung 510D7K	\$139
Samsung K600A	\$119
Samsung C,M,Y600A	\$169
Samsung 1650D8	\$179



Epson Cartridges



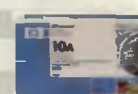
Epson T003091	\$49
Epson T007091	\$29
Epson T008091	\$25
Epson T009091	\$39
Epson T013091	\$23
Epson T014091	\$29
Epson T026091	\$35
Epson T027091	\$29
Epson T028091	\$39
Epson T029091	\$39
Epson T032190,290,390,490	\$39
Epson T034190,290,390,490	\$19
Epson T034590,690,790,890	\$19
Epson T038190	\$19
Epson T039090	\$29
Epson T042290,390,490	\$18
Epson T046190	\$18
Epson T047290,390,490	\$13
Epson T049190,290,390	\$18
Epson T049490,590,690	\$18
Epson T051190	\$28
Epson T052090	\$28
Epson T054190,290,390,490	\$18
Epson T054790,890,990	\$18
Epson T056190,290,390,490	\$13
Epson T059190,290,390	\$19
Epson T059490,590,690	\$19
Epson T059790,890,990	\$19
Epson T062190,290,390,490	\$19
Epson T063190,290,390,490	\$14
Epson T073190,290,390,490	\$15
Epson T081190,290,390	\$24
Epson T081490,590,690	\$24
Epson T082190,290,390	\$19
Epson T082490,590,690	\$19
Epson T557090	\$39
Epson T559190,290,390	\$18
Epson T559490,590,690	\$18
Epson S020118,122,126,130	\$109
Epson S050097,98,99	\$209
Epson S050100	\$99
Epson S050187,188,189	\$159
Epson S050190	\$109
Epson S050226,227,228	\$209
Epson S050229	\$99
Epson S050230,231,232	\$129



HP Cartridges



HP 51625AA	\$45
HP 51626AA	\$45
HP 51629AA	\$45
HP 51641AA	\$45
HP 51645AA	\$42
HP 51649AA	\$45
HP C1823DA	\$45
HP C4836A,37A,38A	\$45
HP C4841A,42A,43A,44A	\$45
HP 92298X	\$159
HP C3903A	\$119
HP C3906A	\$99
HP C4096A	\$139
HP C4127A/C4127X	\$139/179
HP C4191A	\$119
HP C4192A,93A,94A	\$169
HP C7115A/C7115X	\$89/109
HP C8061X	\$179
HP C9700A	\$119
HP C9701A,9702A,9703A	\$139
HP C9720A	\$209
HP C9721A,9722A,9723A	\$279
HP Q1339A	\$279
HP Q2610A	\$159
HP Q2612A	\$99
HP Q2613A/Q2613X	\$99/129
HP Q2624A	\$109
HP Q2670A,71A,72A,73A	\$179
HP Q3960A	\$119
HP Q3961A,62A,63A	\$139
HP Q3971A,72A,73A	\$109
HP Q5942A	\$199
HP Q5949A/Q5949X	\$99/179
HP Q6000A	\$109
HP Q6001A,02A,03A	\$119
HP Q7553A	\$109
HP Y2016AA	\$49
HP C8721WA	\$26
HP C8765WA	\$29
HP C8766WA	\$35
HP C8767WA	\$42
HP C8771WA,72,73,74,75	\$16
HP C9351AA,52	\$25
HP C9362WA,64WA	\$25
HP C9363WA	\$45
HP C9369WA	\$35



Brother Cartridges

Brother LC21BK	\$29	Brother LC800C,Y,M	\$16
Brother LC21C,Y,M	\$16	Brother TN2025	\$79
Brother LC47BK	\$29	Brother TN3030	\$89
Brother LC47C,Y,M	\$16	Brother TN04BK	\$199
Brother LC800BK	\$29	Brother TN04C,Y,M	\$199

USB cables

USB plug a-a 3m/5m	\$12/15
USB extension a-a m-f 2m/3m/5m	\$10/12/15
USB a-b mini 2m/3m	\$12/15
USB2 printer cable 1.8m/3m/5m	\$10/12/15
USB2 Plug a-a 2m/3m/5m	\$10/12/15
USB link/bridge cable for networking	\$35
USB data cable for connet 2 PCs	\$30
USB a to b mitsumi 2m	\$15



IDE Cables

IDE flat ATA33 45cm	\$5
IDE flat ATA100/133 45cm/80cm	\$10/\$15
IDE round ATA100/133 60cm/75cm/85cm	\$18/\$20/\$25
Neon-blue round IDE 75cm 3connector	\$45



SATA Cables

Serial ata power cable 12cm RC-5031	\$8
Serial ata data cable 60cm RC-5032	\$12



Network Cables

RG58 cable BNC for 10/100 Ethernet	\$7/\$8/\$10/\$15/\$20/\$25/\$30
2m/3m/5m/10m/15m/20m/30m	
Cat6 for 10/10/1000 Ethernet Straight Cable	\$7/\$8/\$10/\$15/\$20/\$25
2m/3m/5m/10m/15m/20m	
Cat6 for 10/10/1000 Ethernet Cross-over Cable	\$7/\$10/\$10/\$15/\$20/\$25
2m/3m/5m/10m/15m/20m	



SCSI Cables

LVD external 68pin 2m HD M-M	\$99
Internal LVD terminator HD68F	\$45

MIDI Cables

MIDI Cable 120cm	\$22
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Modem Cables

Null Modem cable db25f-f 2m	\$10
Null modem cable db25f-f 5m	\$15
Null modem cable db9f-db9f 2m	\$10
Null modem cable db25m-9f/25f 1m	\$10



FDD Cables

Floppy cable 55cm	\$5
Floppy cable extension	\$10
Floppy round cable 50cm	\$15
Neon-blue round 48cm	\$29



Parallel Cables

IEEE 1284 Parallel printer cable 1.8m/5m/10m	\$5/\$8/\$12
IEEE 1284 bi-tronic Parallel printer cable 1.8m/5m	\$10/\$20
Parallel cable DB25m-DB25m 1.8m/3m/5m/10m/20m	\$5/\$8/\$10/\$15/\$20
Parallel cable DB25m-DB25f 1.8m/3m/5m/10m/20m	\$5/\$8/\$10/\$15/\$20
Parallel cable DB25f-DB25f 10m	\$15
RC3906 DB25-HPC36M 2M for HP prt	\$19



VGA Cables

VGA monitor cable HD15 m-m 2m/5m	\$5/\$10
VGA monitor extension cable HD15 m-f 2m/3m/5m	\$5/\$8/\$10
RGB monitor cable HD15-3xBNC 1.8m	\$19
RGB monitor cable HD15-4xBNC 1.8m	\$15
RGB monitor cable HD15-5xBNC 1.8m	\$25
Monitor splitter cable 1xHD15m-2xHD15f 2m	\$12
High quality monitor cable m-f with filter 2m/5m/10m/20m/30m	\$12/\$15/\$25/\$45/\$55
High quality monitor cable m-m with filter 2m/5m/10m/20m/30m	\$12/\$15/\$25/\$45/\$55
S-video male to RCA female adaptor	\$8
S-video male to male cable 5m	\$12
S-video to 2x RCA cable 5m	\$12



Power Cables

Internal power splitter cable 2x5.25" f-1x5.25" m	\$5
Internal power splitter cable 2x3.5" f-1x3.5" m	\$5
P4 4-pin converter	\$5
Internal ATX power extension	\$10
PS/2 power cable	\$10
IEC PC-Monitor cable	\$5
PC power cable 1.8m/5m	\$5/\$10
3pin main plug to 2 x IEC female	\$15
IEC male to 2 x IEC female	\$15
Powersupply converter 4pin to 8pin EPS	\$12
Powersupply converter 20pin to 24pin	\$15
Powersupply converter 24pin to 20pin	\$15



IEEE1394 Cables

IEEE 1394 6p-6p 1.8m/5m	\$12/19
IEEE 1394 6p-4p 1.8m/5m	\$12/19
IEEE 1394 4p-4p 1.8m/5m	\$12/19
1394-800 9p-9p 2m	\$25
1394-800 9p-6p 2m	\$25
2port 1394 cable for Gigabyte MB	\$15



PS/2 Cables

PS/2 extension cable MD6 m-f 2m/3m/5m/10m	\$5/\$8/\$10/\$12
PS/2 extension cable MD6 m-m 2m/3m/5m/10m	\$5/\$8/\$10/\$12



Serial Cables

Serial extension cable db9m-f 2m/5m	\$5/\$9
Serial cable db9m-db9m 2m	\$5



Laplink Cables

Serial laplink cable db25m/db9f m-m 2m	\$12
Serial laplink cable 2xdb25f/db9f 2m/3m/5m	\$8/\$10/\$12



Joystick Cables

Joystick extension cable DB15 m-f 2m	\$10
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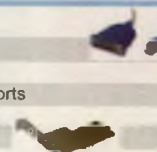
DVI Cables

DVI-D dual link extension m-m/m-f 2m	\$25
DVI-D single link m-m 2m	\$15
DVI-I dual link extension m-m/m-f 2m	\$25
DVI-I single link m-m 2m	\$20
DV17m to VGA hd15f	\$15



Adaptor

USB to parallel adaptor	\$29
USB to serial adaptor	\$29
USB to PS/2 converter 2x PS/2 ports	\$15
2 ports printer card PCI	\$29
2 ports serial card PCI	\$29
3 ports 1394 card PCI	\$29
3.5" USB2 & 1394, PS/2 panel	\$25
5.25" USB2 & 1394, PS/2 panel	\$45
Coolermaster aerogate 2	\$69
Coolermaster musketeer system detector	\$65
Keyboard AT to PS/2 adaptor	\$5
Keyboard PS/2 to AT adaptor	\$5
Mouse PS/2 to serial adaptor	\$5
Notebook HDD to IDE adaptor kit	\$19
USB to 2 game ports	\$35



Audio Cables

CD-Rom audio cable	\$2
DVD-Rom digital 2 pin cable	\$5
Optical square-square digital cable	\$15
Optical square-round 3.5mm digital cable	\$15
Optical round3.5mm - round 3.5mm digital cable	\$15
Audio 3.5 stereo plug 2m	\$5
speakers extension 3.5mm m-f	\$5



Windows XP Home oem

With Windows XP Home Edition, you have the freedom to experience all that your computer and the internet have to offer. With genuine speed and serious stability, this is the operating system home users have been waiting for.

**oem software purchase with system only*



\$139

Windows XP Pro oem

For businesses of all sizes, and for home users who demand the most from their computing experience, Windows XP Professional includes all the features of Windows XP Home Edition, as well as premier security and privacy features, advanced recovery options, an improved ability to connect to large networks and more.

**oem software purchase with system only*



\$209

Windows XP Pro X64 oem

Windows XP Professional x64 runs on x64 processors. 64-bit native applications can deliver more data per clock cycle, making them run faster & more efficiently. It supports up to 128MB RAM & 16 terabytes of virtual memory, enabling applications to run faster.

**oem software purchase with system only*



\$209

Windows XP Media Center 2005 oem

Windows XP Media Center Edition 2005 combines a powerful home PC with a digital entertainment system. It's the most advanced version of Windows you can get for a home PC, and lets you create and manage all your digital entertainment with one remote control.

Remote Control: \$59
\$179



Vista Home Basic oem

Windows Vista Home Basic is the edition of Windows for basic home computing needs. If you only want to use your PC for tasks like browsing the Internet, using e-mail, or viewing photos, then Windows Vista Home Basic may be the right edition for you.

**oem software only purchase with system*



\$129

Windows Vista

Vista Home Premium oem

Windows Vista Home Premium delivers the productivity and entertainment that you need from your PC at home or on the go. It includes Windows Media Center, and that makes it easy to enjoy your digital photos, TV and movies, and music. Plus, you'll have the peace of mind of knowing that your PC has a whole new level of security and reliability.

32bits / 64bits

\$159/169



Windows Vista

Vista Business oem

Windows Vista Business is the first Windows operating system designed specifically to meet the needs of small businesses. You'll empower your entire business to work more efficiently with a stunning and improved, simple-to-use interface that makes it easier to search and find the information you need quickly and easily, both on your PCs and on the web.

**oem software only purchase with system*



\$209

Windows Vista

Vista Ultimate oem

Windows Vista Ultimate offers all of the features found in Windows Vista Home Premium, including Windows Media Center, Windows Movie Maker with high-definition support, and Windows DVD Maker. It also offers all of the features found in Windows Vista Business, including business networking, centralized management tools, and advanced system backup features. And Windows Vista Ultimate has all of the new security and data protection features that help take Windows Vista to a whole new level of dependability.

32bits / 64bits

\$269/279



Windows Vista

Office 2003 Basic oem

Microsoft Office 2003 Basic:

- Includes Word 2003, Excel 2003 & Outlook 2003
- Reduce document sharing or unintended use by setting an expiration date
- Helps to protect documents from being unintentionally changed by using Word Formatting & Editing Restrictions



\$239

Office 2003 SBE oem

Microsoft Office 2003 SBE:

- Includes Word, Excel, Outlook with Business Contact Manager, Powerpoint, and Publisher 2003
- Uses familiar, integrated, and easy-to-use software, creates impressive sales and marketing materials in-house, and handles e-mail and share information efficiently and securely



\$339

Office 2003 Pro oem

Microsoft Office 2003 Pro:

- Includes Word, Excel, Outlook with Business Contact Manager, Powerpoint, Publisher, Access 2003
- enables people to: Manage customers and create impressive marketing materials; Manage e-mail and share information efficiently and securely



\$399

Office Home and Student 2007

Office Home and Student 2007 provides software essentials that enable home PC users to easily create great-looking documents, spreadsheets, and presentations, and manage their notes.

Office Home & Student 2007 MLK: \$179



\$209

Office Basic 2007 MLK*

Microsoft Office Basic 2007 is the essential, pre-installed software suite for homes and small businesses with new computers that enables you to quickly and easily create great-looking documents and spreadsheets and manage e-mail. The latest release features a new streamlined user interface that exposes commonly used and familiar commands, enhanced graphics and formatting capabilities that enable you to create high-quality documents, new time management tools to help manage your schedule, and more reliability and security.

** MLK: Medialess License kit, purchase with system only*



\$239

Office SBE 2007 MLK*

Office Small Business 2007 is a complete set of productivity and contact management tools to help you accomplish routine tasks quickly, efficiently manage customer and contact information in one place, and produce professional-quality marketing communications and campaigns in-house. - Powerful and easy-to-use suite of productivity and contact management software features new tools to help you save time, stay organized, and deliver better customer service.

** MLK: Medialess License kit, purchase with system only*



\$339

Office Pro 2007 MLK*

Microsoft Office Professional 2007 is a complete suite of productivity and database software that will help you save time and stay organized. Powerful contact management features help you manage all customer and prospect information in one place. Develop professional marketing materials for print, e-mail, and the Web, and produce effective marketing campaigns in-house. Create dynamic business documents, spreadsheets, and presentations, and build databases with no prior experience or technical staff. You will learn new features rapidly using improved menus that present the right tools when you need them.



\$439

Office Pro 2007 Academic

Office Professional 2007 helps professionals work faster, stay organized, and manage contacts and customer information in one place. Office Professional 2007 academic applications included:

- Word 2007
- Excel 2007
- PowerPoint 2007
- Outlook w/Business Contact Manager
- Publisher
- Access™



\$249

Macfee Internet Security 2007 oem

McAfee Internet Security Suite 2007:

- Prevents viruses & hackers from infecting & invading your PC
- Stops unwanted, inappropriate and malicious email
- Protects against spying and pop-up ad programs
- Helps stop identity theft

McAfee Virus Scan 2007

\$29

\$39



Norton Internet Security 2007 oem

Norton Internet Security 2007 provides essential protection from viruses, hackers, and privacy threats. Norton™ Personal Firewall keeps personal data in and hackers out. And Norton™ Privacy Control, AntiSpam™, and Parental Control safeguard you from other common online risks.

Norton Anti-Virus 2007

\$39

\$49



Norton Ghost V10

Creates a complete backup of a hard drive; easy to use, even for novices; supports encryption. Norton Ghost 10's usability and feature enhancements include data encryption and better tools for managing backed-up data. These make it a unique and powerful backup application, even for novice users.



\$99

PC Cillin Internet Security 2007 oem

Trend Micro™ PC-cillin™ Internet Security provides comprehensive and easy to use protection from viruses, hackers, and other Internet-based threats. Its new advanced features go far beyond standard antivirus and firewall protection.



\$39

Adobe Photoshop Elements 5.0

Adobe Photoshop Elements 5.0 combines power and simplicity to help you do it all. Edit and enhance your photos by fixing common flaws instantly or using advanced options for more control.



\$149

Adobe Premiere Elements 3.0

Adobe Premiere Elements 3.0 makes creating and sharing impressive home videos a snap. Burn your footage to DVD in two simple steps, complete with a DVD menu and scene index, or easily assemble your movie by rearranging clips with drag-and-drop simplicity.



\$149

Adobe Acrobat 8 Professional

Adobe® Acrobat® 8 Professional software enables business professionals to reliably create, combine, and control Adobe PDF documents for easy, more secure distribution, collaboration, and data collection.



Academic Version
\$219

\$639

Nero 7 Premium Retail

Nero 7 Premium enables you to experience your digital media in completely new and innovative ways. With the addition of a Nero Home – media manager, you can now have the complete PC and TV experience.



\$129

ASUS P525 PDA Phone

Intel XScale Processor 416MHz, 320 x 240 2.8" TFT active matrix - transfective, 64MB RAM+128MB ROM, iRDA 802.11g/Bluetooth 2.0, Microsoft Windows Mobile 5.0 Phone Edition, Touch-screen, keypad, 5-way joystick, Quad-Band Smart-phone.



\$699

ASUS MyPal A639 GPS

Intel XScale Processor 416MHz, 3.5" TFT LCD, 1Gb Flash+64MB SDRAM, 802.11b/g/ BT 2.0, Windows Mobile 5.0
 • With the 1GB memory capacity built in
 • Large built-in 1GB Flash and SD expansion
 • Wireless freedom
 • GPS, Wi-Fi and Bluetooth in 1 Device
 • Swivel GPS Patch Antenna



\$629

HP IPAQ HX2190

HP IPAQ HX2190 pocket PC, Intel PXA270 312MHz Processor, 128MB ROM, 64MB RAM, 3.5" Transfective QVGA TFT, Bluetooth, CF/SDIO, Windows Mobile 5.0 Premium Edition. Dimensions: 119.4mm (H) x 76.6mm (W) x 16.3mm (D), Weight: 164.4g.



\$469

HP IPAQ HX2490

HP IPAQ HX2490 Pocket PC Intel PXA270 Processor 520MHz, 128MB ROM, 64MB RAM, 3.5" Transfective QVGA TFT, Integ 802.11b, Btooth, CF/SDIO, MS Windows Mobile 5.0 Premium Edition Dimension: 119.4 x 76.6 x 16.3 mm / Weight 164.4 g



\$559

HP IPAQ HX2790

HP IPAQ HX2790 Pocket PC Intel PXA270 Processor 625MHz, 192MB ROM, 64MB RAM, 3.5" Transfective QVGA TFT, 802.11b, Bluetooth, CF/SDIO, Biometric Reader, Windows Mle 5 Premium Edition Dimension: 119.4 x 76.6 x 16.3 mm / Weight 164.4 g



\$729

HP IPAQ RW6828

• Intel PXA272 416 Mhz
 • 64MB RAM & 128MB flash ROM
 • 2.7" transmissive QVGA (240x320 pixels) TFT LCD with 18-bit
 • Dimension: 102 x 58 x 19.5 mm, Weight: 140g
 • Bluetooth devices



\$829

HP IPAQ HW6515

• Intel® PXA270 Processor 312MHz
 • Up to 55MB user available memory
 • Display: Transfective TFT QVGA color with LED backlight with power save mode
 • Built-in camera, GPS receiver, bluetooth
 • MS Windows Mobile 2003
 • 118mm x 71mm x 18mm, Weight: 165g



with GPS \$959

\$829

HP IPAQ HW6965

• Intel PXA270 Processor 416 Mhz
 • 45MB available for persistent user storage 64 MB SDRAM
 • Display: 75 mm Transfective TFT color
 • Camera 1.3 Mega pixels
 • Win Mobile 5.0 software
 • 118 x 71 x 18 mm, Weight 179.45 g



with GPS \$1199

\$1079

Mitac Mio P350 GPS

• Cpu: Samsung 2440 400Mhz
 • Video Display: 3.5" Transmissive LCD, anti-glare, Brightness 350nits
 • Memory: ROM 128 MB Nand flash, 64 MB SDRAM
 • GPS Module: Built in GPS module
 • Input Method: Stylus / On-Screen Keyboard/ Handwriting Recognition
 • Speaker: Built-in loud-speaker x 1



\$469

Mitac Mio P550 GPS

• Cpu: Samsung 2440 400Mhz
 • Video Display: 3.5" Transmissive LCD, anti-glare, Brightness 350nits
 • Memory: ROM 128 MB Nand flash, 64 MB SDRAM
 • GPS Module: Built in GPS module
 • Touch Panel: Resistive type touch panel
 • Input Method: Stylus / On-Screen Keyboard/ Handwriting Recognition



\$669

TOMTOM ONE GPS Navigation

• Processor: 266MHz
 • Memory: 256MB
 • Screen: 3.5", 320 x 240 full TFT Color LCD
 • Dimension: 110x89x34mm
 • Weight: 260g



4.3" Screen

\$589

\$499

TOMTOM GO 910 GPS Navigation

• Processor: 400 MHz ARM920T
 • Capacity: 64MB RAM
 • Storage: HDD (20 GB, >10 GB)
 • Screen: 4 inch, 480 x 272 TFT, 64,000 colours
 • Dimension: 112x81x66
 • Weight: 340g



\$869

Laptop Accessories

Antec Notebook Cooler

Antec Notebook Cooler, USB Powered, Dual 80x15mm double ball bearing fan, 2-speed Fan Switch (1350RPM/1800RPM), Fan Specifications: Low - 1350RPM Speed, 8.5CFM Air-flow, 23dBA Noise, High - 1800RPM Speed, 13CFM Airflow, 27dBA Noise, 19 inch USB Cable Silver or Black Color available



\$59

ASUS ADA-65W

Power Adapter

• Notebook Models Suited : A6BNe, A35L, A35N, A38N, A38G, M6BR, M6Sne, V68V, M6A, W3N, W1Sna, W1SGC
 • Input Voltage 100-240VAC, 50/60Hz Universal
 • Output Voltage 19VDC,



\$79

IBM Thinkpad Port Replicator II (74P6733)

• Apply for all Thinkpad X, T, R and A series models except Re series
 • Provide easy cable management
 • Helps maintain the mobility afforded by a Thinkpad system
 • Offers pass-through connection for Gigabit Ethernet, USB2.0 and DVI ports



\$169

COOLER MASTER NotePal W1

• Efficiently reduce the temperature of notebook, Enhance notebook stability and durability
 • Ergonomic design offers best in comfort and productivity
 • All Aluminum curvy design
 • Super silent
 • Silver or Black Color



\$59

Kensington Notebook Dock with Audio 33241

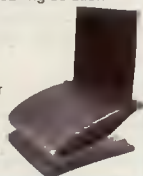
• Multi-function port replicator provides 5.1 audio jacks, parallel and serial ports, and three USB 2.0 ports.
 • 5.1 surround sound support includes rear, front, and centre speaker outputs.



\$129

Kensington Laptop Desktop USB Stand 60148

• Space saving, money-saving solution eliminates the need for extra monitor
 • Built-in 4 port USB 2.0 hub provides one-time connection for computer accessories.



\$119

Kensington Twin Slim Microsaver Lock

• Suitable for Toshiba Satellite Pro/Tecra/Portege series • Designed for use with Kensington security slot. It offers the strongest protection with its two patented T-bar locks. It is long enough to comfortably secure two pieces of computer equipment.



\$129

FSP Universal Notebook Power Adapter

Providing power solution for your mobile computing needs, available in: 65W, 90W, 120W

NB65 \$49

NB90 \$69

NB120 \$99



Targus 15.4" Traditional Notepac Notebook Case

Targus CN01 Notebook Case suitable for all popular notebooks. Size: 36x28x6cm. Fully Expanded to 38x30x12.5cm.



\$49

Targus Traditional XL Notebook Case up to 17"

The CNXL2 XL Notebook Case is a stylish case made from a combination of nylon materials that will hold notebooks with screens up to 17 inches.



\$99

TOSHIBA Advanced Port Replicator III+ PA3474A

• Built-in 10/100 RJ-45 Ethernet port
 • Built-in RJ11 Modem port
 • One 9-pin serial port & 4 USB2.0 ports
 • Connector for external VGA & DVI
 • PS/2 port, Parallel printer port,
 • Kensington lock and security key



\$299

hp Notebook Mobility Pack EV098PA

• Kit Contents: Evolution Extra Lite Carry Case, 2.4GHz Wireless Rechargeable Mouse, HP 256MB USB Flash Drive
 • Suits: HP Compaq nx6120 Notebook PC
 • Light weight & compact



\$59

Skymaster KVM Switch 2 or 4 Ports

- Support Win 95/98/2000/ME/XP/NT, Unix, Linux
- Hot Plug - add or remove connected PCs for maintenance without powering down the KVM Switch or PCs.
- Very high video quality - up to 1920 * 1440

\$39/59



Aten USB KVM Switch 2 or 4 Ports

- Aten 2/4ports Auto USB KVM Switch:
- One USB keyboard, USB mouse, and VGA monitor controls two computers. Non-powered
- Supports multimedia USB keyboards
- Audio jack provided for speaker sharing

\$69/99



D-Link KVM Switch 2 or 4port DKVM-2K/ 4K

- Supports Up to 2048 X 1536 Resolution
- Includes Two 6' Standard KVM Cables
- Convenient Select Button and Hot-Keys
- Plug and Play

**DKVM-2K 2port
DKVM-4K 4port**

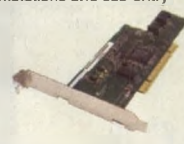
\$59/99



Adaptec AAR 1210SA Serial ATA RAID Card

The Adaptec Serial ATA RAID 1210SA provides cost-effective, high-performance storage connectivity and data protection for desktops, workstations and sub-entry servers.

\$89



Adaptec AAR 2420SA Serial ATA RAID Card

Adaptec SATA II technology delivers data transfer rates with 3 Gb/s while also supporting 1.5 Gb/s (SATA I). The Adaptec Serial ATA II RAID 2420SA card is a four-port controller that supports SATA or SATA II direct attached disk drives. It features standard RAID 0, 1, 5 and 10 as well as an optional Advanced Data Protection Suite.

\$489



Adaptec AVA 2906 SCSI Controller

The Adaptec SCSI Card 2906 protects your SCSI peripheral investment by providing the same internal and external connections previously available with built-in Mac SCSI.

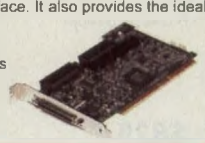
\$85



Adaptec ASC29160 Ultra SCSI Controller

The Adaptec SCSI Card 29160 is tailored for entry to mid-range server environments. It delivers the maximum throughput for a single channel Ultra160 SCSI card by using a 64-bit PCI interface. It also provides the ideal connection to Ultra160 SCSI (LVD) hard disks and devices.

\$299



Adaptec ASC29320 Ultra SCSI Controller

The Adaptec SCSI Card 29320A-R is a half-size, 64-bit 133 MHz PCI-X, single-channel Ultra320 SCSI card with integrated HostRAID. The Adaptec 29320A-R includes a legacy SCSI connector and is a cost-effective RAID 0, 1 and 10 solution.

\$329

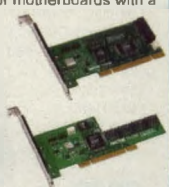


PROMISE FastTrak TX2300 / TX4310

Cost-effective RAID 0/1 controller with SATA 3Gb/s drive support for motherboards with a PCI interface, 32-Bit / 66 MHz.

**TX2300
2ports, Raid 0/1
TX4310
4ports, Raid 0/1/10**

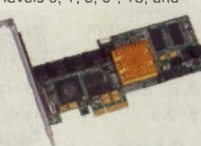
\$129/229



PROMISE EX8350 8port SATA2 PCIE

- 8-Port Serial ATA (SATA) RAID controller with 3.0 Gb/s per port
- PCI-Express x 4 Host Bus Interface
- Support RAID levels 0, 1, 5, 6*, 10, and JBOD
- Linux open source driver support

\$629



Thecus N2050 Personal Backup Device

Thecus N2050G Personal Backup Device, Green or Blue Color, 2x SATA RAID Bays, SATA/USB dual mode external interfaces, PCI eSATA Card not included

\$209



Thecus N2100 Personal Backup Device

Thecus N2100 IP FTP/Web Photo/iTunes Server Storage Appliance, Pearl or Black Color, 2x SATA RAID Bays, 128MB DDR, 3x USB2.0, Dual Gigabit Ethernet, AC adapter

\$449



ASUS Bluetooth Dongle WL-BTD201M

Asus Bluetooth Dongle, V2.0, Class 1, EDR, USB2.0, 3Mbps, 100M

The WL-BTD201M Bluetooth dongle leverages the latest Bluetooth 2.0 specifications and Enhanced Data Rate (EDR) to provide high-speed connection with a full array of Bluetooth-applicable devices.

\$49



D-Link USB Bluetooth Adaptor DBT-122

- Connect with Bluetooth Enabled Devices
- Works with PC & Mac
- Seamless Wireless Personal Area Network (PAN) Connectivity
- Operation range - 100 metres (33ft) range

\$59



Skymaster PCI ATA133 IDE RAID Controller

- PCI Bus Master DMA Transfer Rate up to 133MB/s
- Supports 4 IDE Hard Disks with 133MB/s Transfer Rate
- Supports RAID 0, 1, 0+1

Non Raid IDE Controller: \$39

\$39



Skymaster PCI Serial ATA 2/4 port Controller

- Dual independent DMA channels with 256KB FIFO per Serial-ATA channel, transfer rate up to 1.5Gb/s
- Serial ATA Specification Revision 1.0 compliant
- Internal Serial-ATA port x 2

**2port / 4port
\$39/49**



PCMCIA to USB2 or 1394 Adaptor

- 3 Ports USB 2.0 or 1394 CardBus
- Provides 3 External Ports to Laptop
- Driver Supports: Windows 98 / ME / 2000 / XP

\$35



PCMCIA to USB2 & 1394 Combo Adaptor

- PCMCIA CardBus Interface with Power Management
- Provides two USB Root ports with high-speed 480Mbps
- Provides one 1394 port and one mini-1394 port with 400, 200 and 100 Mbits/s traffic

\$59



Skymaster USB2.0&1394 COMBO PCI Card

- Chipset: 1394-VIA VT6306, USB 2.0-VIA VT6202
- Speed: 1394 Asynchronous and Synchronous data transfer 400/200/100Mbps USB each port 480Mbps
- O/S Supports: Win 98SE/ME, Win 2000/XP

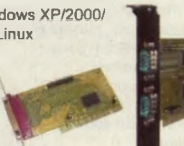
\$39



Skymaster 2 ports Parallel / Serial PCI Card

- Total Plug and Play, slide bars PCI 32bit
- Give two extra two parallel or serial ports to your PC
- Drivers for Windows XP/2000/NT, 98/95 and Linux

\$29



Skymaster 1394 Adaptor

- VIA VT6306 chipset
- Easy plug-n-play connectivity and set-up
- IEEE 1394 data transfer rate up to 400 or 800Mbps
- Supports Windows 98SE, ME, 2000/XP and Mac OS

**Firewire
400 / 800
\$29/79**



AL TECH Portable MPEG4 Player MG-25

An entertainment product of tomorrow. This portable media player allows DivX, MPEG4, DAT, Xvid, MP3, OGG, WMA and JPEG play back from any 2.5" notebook sized hard disk. A 2.5" notebook hard disk is required.

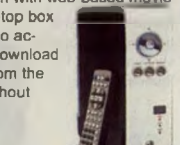
\$139



AL TECH Portable Media Player ALT-MG35

Mediagate MG-35 is a high-performed, DMA with 3.5-inch HDD inside. It can be configured in collaboration with web-based movie distributor as a set-top box or media gateway to access, play and/or download the legal movies from the website directly without home PC.

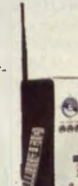
\$199



AL TECH Wireless Portable Multimedia Player MG-350HD

- Watch High Definition movies on Standard Definition TVs
- Built-in hardware zoom
- Featuring NDAS networking technology
- 11g wireless connection and 10/100 Ethernet port
- Ability to wirelessly stream media without a HDD

\$309



D-Link DCS-900

IP Camera

- Web-based Remote Access Using Any Java Enabled Web Browser
- 10/100Mbps Fast Ethernet Connection
- Manual, Motion Triggered, or Scheduled Recording Options



\$239

D-Link DCS-G900

Wireless IP Camera

- Network Surveillance Camera suitable for the Home / SOHO - 10/100Mbps Fast Ethernet Port & IEEE 802.11g (54Mbps) Wireless LAN
- 640x480 Video Resolution • Up to 30 Frames Per Second Video



\$249

D-Link DCS-3220

IP Camera with 2-Way Audio

- Monitor Your Home or Office Over the Internet
- Listen and Talk with 2-Way Audio1
- 4x Digital Zoom2 for Close-up Viewing
- Built-in Motion Detection with E-mail Notification



\$569

D-Link DCS-3220G

Wireless IP Camera

- First 802.11g Wireless Internet Camera
- 2-Way Audio1 and Built-in Motion Detection with E-mail Notification
- 4x Digital Zoom2 for Close-up Viewing



\$689

D-Link DCS-5300

IP Camera

- CCD Sensor for Superior Quality Video
- Built-in Microphone for Audio Monitoring and Recording
- High Quality MPEG-4 Short Header Mode Compression
- Built-In Motion Detection & Email Notification



\$699

D-Link DCS-5300G

Wireless IP Camera

- First-to-Market 802.11g Wireless IPCamera
- Built-in Microphone for Audio Monitoring and Recording
- Built-in Motion Detection with E-mail Notification
- Connection to TV or VCR for Recording



\$849

D-Link DCS-6620

IP Camera

- Motorized Pan/Tilt/Zoom
- User-Selectable Compression Codec - MJPEG and MPEG-4
- 2-Way Audio Support
- Extreme Low Light Sensitivity
- Smooth Video Recording of Up to 30 FPS



\$1149

D-Link DCS-6620G

Wireless IP Camera

- 802.11g Wireless Connectivity
- User-Selectable Compression Codec - MJPEG and MPEG-4
- 2-Way Audio Support
- Extreme Low Light Sensitivity
- Smooth Video Recording of Up to 30 FPS



\$1369

Voice Over IP

LINKSYS PAP2 Phone

Adapter with 2 Ports

- Enables high-quality feature-rich telephone service through your cable or DSL Internet connectionable or DSL internet connection.
- Two standard telephone jacks for phones or fax
- Clear sounding voice service



\$79

LINKSYS RT31P2 VOIP

Broadband Router

- Three 10/100 Ethernet ports.
- Two voice port for analog phones or fax machine.
- Supports Quality of Service to maximise VOIP
- Web based configuration, remote firmware upgrade



\$139

LINKSYS WRT54GP2

Wireless-G Router

- All-in-one Internet-sharing Router, 3-port Switch & 54Mbps Wireless-G Access Point
- Two standard phone jacks
- High security: Wi-Fi Protected Access, wireless MAC address filtering, powerful SPI firewall



\$159

LINKSYS CIT200 Skype

Phone

- Cordless Internet Telephony Kit.
- Functionality of a regular phone, through Skype.
- USB Base Station connects to your PC.
- Back-lit colour LCD display.
- Includes 60 minutes of SkypeOut credits

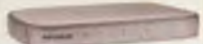


\$109

NETGEAR TA612V

Broadband Voice Adapter

- Turns your Broadband Internet Service into a Telephone
- 2 ports to connect analogue phones & fax
- Shares Internet connection via Ethernet ports & Broadband modem
- Prioritises voice traffic for optimum QoS
- Call Features include: Called ID, Call Waiting & Voicemail



\$99

NETGEAR DG834GV

Wireless ADSL2+ Modem

Firewall Router VOIP

- DG834GV combines an ADSL2+ Modem, Router, 10/100 Wired LAN Switch, 802.11g Wireless Access Point, Voice-over-IP (VoIP), and SPI Double Firewall.



\$209

NetComm V300 Two Port

VoIP Adaptor + Router

- NetComm's V300 VoIP Telephone Adaptor/Router has been designed for residential and small business users to deliver predictable real-time voice quality over the Internet. It connects directly to any broadband modem and service (Cable or DSL) which supports VoIP.



\$149

NetComm NB9W MyNet

Gateway

- The NB9W MyNetGateway delivers an all-in-one Integrated Access Device. It includes an ADSL2+ modem, 4-port Layer 3 Quality of Service (QoS) router, 2x FXS ports for VoIP equipment, 1x FXO port for PSTN lifeline backup and 802.11g wireless in one device!



\$219

BILLION BiPAC 6404VGP

VoIP Firewall Router

- Broadband sharing with fast Ethernet switching • Voice-over IP - compliant with SIP standards • Two FXS ports for connecting to regular telephones
- One FXO port for voice calls via PSTN Fixed-line • Gateway "Least Cost Routing" support



\$179

BILLION 7401VGPM

VoIP / ADSL2+ / Router

with 4-port Switch

- Voice over IP compliant with SIP standard
- High speed Internet Access with ADSL2/2+
- SOHO Firewall Security with DoS Prevention and SPI



\$189

BILLION 7404VGPM

VoIP / ADSL2+ Firewall

Router with PSTN

- Voice over IP compliant with SIP standard
- High speed Internet Access with ADSL2/2+
- Gateway - Least Cost Routing
- SOHO Firewall Security



\$249

BILLION 7404VGOM

VoIP / ADSL2+ VPN Fire-

wall Router with PSTN

- Voice over IP compliant with SIP • Gateway • VPN with powerful 3DES
- High speed Internet Access with ADSL2/2+
- SOHO Firewall Security with DoS Prevention and SPI



\$299

BILLION BiPAC 7300

ADSL2+ Firewall Router

- Easy to set up to surf the net! Billion's BiPAC 7300(G) series is an all-in-one compact package of ADSL2+ router perfectly designed for home and SOHO users to enjoy the mobility and faster speed when using ADSL Internet connection



\$69

BILLION BiPAC 7300G

ADSL2+ Firewall Router

- Billion's BiPAC 7300(G) series is an all-in-one compact package of ADSL2+ router. It lets you access high-speed ADSL Internet connection, even faster with advanced ADSL2+ capability with downstream rate up to 24Mbps



\$129

BILLION BiPAC 7402LM

ADSL2+ / Router with Switch

- High-speed Internet Access with ADSL2+ up to 24Mbps
- SOHO Firewall Security with DoS Prevention and SPI
- Parental Control with URL Blocking and Packet Filtering



\$149

BILLION 7402R2M

ADSL2+VPN Firewall Router

- VPN with 3DES is up to 3.5 Mbps
- SOHO Firewall Security with DoS Prevention and SPI
- Parental Control with URL Blocking and Packet Filtering
- High-speed Internet Access with ADSL up to 8Mbps



\$179

Notting Hill (Head Office)

7 Howleys Rd., Notting Hill

Tel: (03) 8542 8688

Fax: (03) 8542 8699

West Melbourne Branch

130 Dudley St., West Melbourne

Tel: (03) 9223 4288

Fax: (03) 9328 1899

POS Equipment

PSC QS2500 Scanner

For retail, office, and light-industrial applications, the QS2500's 200 scans-per-second linear imager scan engine provides snappy reading performance and a mid-range depth-of-field.



PS/2 or USB

\$199/219

PSC QS1000 Scanner

Sleek Design and Powerful Performance. A Winning Combination in an Affordable Bar Code Scanner. The QS1000 Scanner offers you all the benefits of laser scanning at what used to be CCD prices.



PS/2 or USB

\$269/289

PSC QS6500 Scanner

Fast, Ergonomic Scanning of All Supported Symbolologies. The PSC QS6500 includes aggressive scanning performance, an ergonomic feel, excellent field depth and fast 1D and PDF bar code reading.



PS/2 or USB

\$329/349

PSC PSSR-0000

PowerScan Scanners

Even in the most harsh working environments, you can depend on the PowerScan scanner to keep on working. PSSR-0000, standard range, un-coded.



PS/2 or USB

\$639/659

DENSO GT10 Bluetooth Smart Scanner

- Bluetooth 70cm scan distance
- Long range CCD
- Fast reading and decoding
- Ultra bright scanning beam
- Multi colour LED
- Vibrate and beep functions



\$799

DENSO Portable Scanner G8044

- Denso Contact Scan model up to 25cm, 4 Mb RAM
- Large liquid crystal display of 128 x 64 dot
- Wide key pitch 13.7mm



\$959

Zebra LP2844 Direct Thermal Barcode Label Printer

Reliable desktop printer featuring USB & optional network interfaces



\$559

Zebra TLP2844 Thermal Transfer Barcode Label Printer

Reliable desktop printer featuring USB & optional network interfaces



\$699

POSIFLEX FPP5600DP Impact Receipt Printer

Paper Tear Bar, 42 column Dot Matrix, Approx 3.5LPS, 20kb Input buffer. Up to 3 ply print, ESC/POS Command Compatible. Paper Roll: 76x76mm box of 24: \$29



\$359

POSIFLEX FPP7000U Thermal Receipt Printer

High Speed, up to 180mm per sec, Auto Paper Cutter, Drop & Load Paper loading, Stores Graphic Logo, USB Interface.



\$539

POSIFLEX FCR4100 Cash Drawer

Innovative Screwless Secured Design, three position lock, Cheque slot, supplied with 1 metre modular connector (RJ12) cable to connect Posiflex, Epson, Star, Axiohm & current Citizen printers.



\$159

POSIFLEX FCR4101 Cash Drawer

Smart externally powered POS cash draw, serial and parallel pass-through capabilities, include plug-in external power supply, 1.8m cable and cash insert.



\$249

POSIFLEX FCD2860P Barcode Scanner

CCD contact technology, 80mm reading aperture, 0-30mm scanning distance, Auto discrimination, Manual trigger, Beeper & LED indicator.



PS/2 or USB

\$149/159

POSIFLEX FCD3830P Barcode Scanner

CCD long range technology, ergonomic and light weight design, wide reading aperture, 0-300mm scanning distance, Auto discrimination, Manual trigger, Beeper & LED indicator.



PS/2 or USB

\$199/219

Symbol LS-2208 Laser Scanner

The high-value LS2208 hand-held scanner offers superior performance, excellent reliability and user-friendly ergonomics to create a more productive mobile environment.



\$319

Symbol LS-9203 Omni Directional Bench Scan

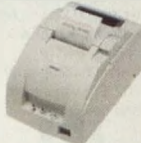
The LS9203's high-performance handheld and presentation scanning capability enables point-of-sale employees to work faster and more accurately.



\$429

EPSON ETMU220D Impact Receipt Printer

Epson Impact receipt printer, 9-pin dot matrix, includes power cable and data cable, USB or parallel interface.



\$429

EPSON ETMU220B Impact Receipt Printer

Epson Impact receipt printer, auto paper cutter, 9-pin dot matrix, includes power cable and data cable, USB or parallel interface.



\$549

EPSON ETMT88U Thermal Receipt Printer

Epson thermal receipt printer, high speed up to 150mm per sec, auto paper cutter, 42/56 column, drop & load paper loading, USB or parallel interface.



\$689

EPSON ETMT90 Thermal Receipt Printer

Epson thermal two color receipt printer, high speed up to 170mm per sec, auto paper cutter, 42/56 column, drop & load paper loading, parallel or serial interface.



\$789

Tape Drives

SONY IDE 20-52GB Turbo Tape SDX260VR

Large capacity, high speed backup for entry level business

- AIT-E Turbo Internal IDE
- Capacity: 20GB native, 52GB max
- Sustained Trans. rate: 6.0 MB/s Native
- 12MB Buffer memory



\$749

SONY SCSI 20-52GB Turbo Tape SDX250VRB

• AIT-E Turbo Internal Scsi

- Capacity: 20GB native, 52GB max with 2.6:1 ALDC Compression
- Sustained Trans. rate: 6.0 MB/s Native
- Ultra Wide 68-pin High density connector
- 12MB Buffer memory



\$829

SONY IDE 40-104GB Turbo Tape SDX460VRB

• Formats Supported: AIT-1 Turbo, AIT-E Turbo, AIT-1.

- Media Supported: 8mm 230m (with or without MIC).
- Native Capacity: 40GB.
- Native Storage Speed: 6MB/S.



\$929

SONY IDE 80-208GB Turbo Tape SDX560VRB

• Formats Supported: AIT-2 Turbo, AIT-E Turbo, AIT-2.

- Media Supported: 8mm 230m (with or without MIC).
- Native Capacity: 80GB.
- Native Storage Speed: 12MB/S.



\$1459

Seagate 20GB Travan Internal Tape Drive STT220000A-SST

Travan 20 internal tape drive with ATAPI interface, has up to 10GB native capacity and 20GB compressed capacity.



\$299

Seagate 40GB Travan Tape STT3401A-SST

Travan 40 internal tape drive with ATAPI interface, has up to 20GB native capacity and 40GB compressed capacity. Sustained data transfer rate up to 120 MBytes/minute.



\$479

Seagate Quantum DDS4 Int. STD2401LW-SST

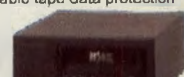
Certance DDS-4 40GB tape drive solutions leverage DDS-4 technology and Certance-exclusive features to provide the most reliable and affordable tape data protection to the small and medium businesses.



\$699

Seagate Quantum DDS4 Ext. STD6401LW-SST

Certance DDS-4 40GB tape drive solutions leverage DDS-4 technology and Certance-exclusive features to provide the most reliable and affordable tape data protection to the small and medium businesses.



\$859

harristechnology



1 - 30 June 2007

TAX TIME SAVINGS

FASTER, BROADER, BETTER
BRAND NEW INTEL® CENTRINO® DUO
PROCESSOR TECHNOLOGY HAS ARRIVED

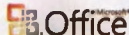
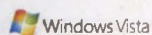


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3 fantastic bundle offers
with Microsoft Office 2007



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available online.

**1TB BigDisk
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CASHBACK^



RENTSMART
Because buying isn't

^Terms and Conditions: This offer is available to approved customers who RentSmart \$1750 or more of business equipment at Harris Technology. Approval conditions apply. Offer is not available on 24-month terms. Offer available from 01.06.07 - 30.06.07. To redeem this offer you must complete the online redemption form with 30 days of your application date. Not to be used in conjunction with any other RentSmart offer. While stocks last. RentSmart is a rental facility operated by RentSmart Pty Ltd. and is available to approved customers on selected products with a total retail value over \$550. ABN 16 073 225 457.

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10% OFF



10% Off any Brother Laser Printers



ONLINE ONLY

10% OFF

10% Off any Brother Toner



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Online Only Offers available online only between 01/06/07 and 30/06/07. Delivery charges may apply. Not available in conjunction with any other offer. Not available in Business Centres or via phone. No further discounts available. Only while stocks last. Limited supply per customer [except SA]. Offer subject to Harris Technology's Returns Policy and Terms & Conditions of purchase.

AcerPower
1000 USFF



NEW

\$99 CASHBACK OFFER¹

\$1098

U4580 | RENT \$12.72/wk*
AFTER CASHBACK YOU PAY \$999

¹see page 6 for terms & conditions



Colour LaserJet 2840
Multifunction Printer



BONUS COLOUR TONER PACK²

\$1399

S1217 | RENT \$15.69/wk*

²see page 13

Proliant ML110G4
Small Business Server



\$696 PRICE DROP

MICROSOFT SMALL BUSINESS SERVER

\$999

U3865 | RENT \$11.56/wk*
see page 9

Harmony Advanced
Universal Remote 1000i



**\$214 OFF
HOT PRICE**

\$485 | U5173

see page 11

8GB Pocket Disk Drive
USB 2.0



NEW

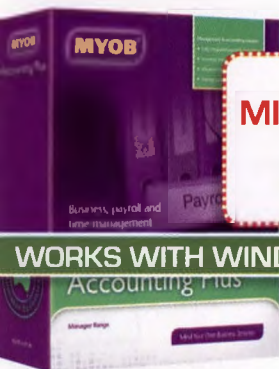
MASSIVE 8GB

SUPER HOT PRICE

\$169 | U7845

see page 11

Accounting
Plus v16



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MICROSOFT
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DESKTOP
4000³**

WORKS WITH WINDOWS VISTA

\$475 | U0170

³see page 15 for terms & conditions

PC-Cillin Internet
Security 2007



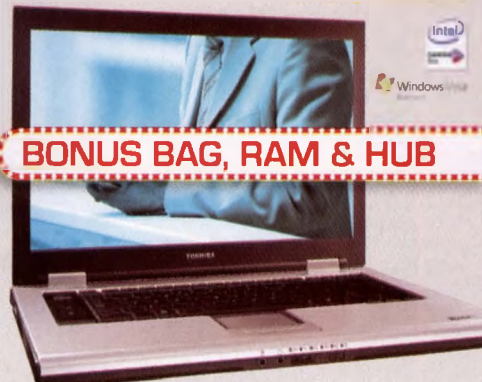
**BONUS 1GB
MP4 PLAYER**

\$99 | U0389

⁴see page 15 for terms & conditions

Tecra A8

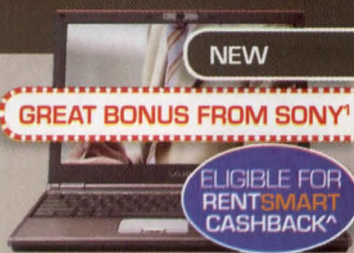
TOSHIBA



BONUS BAG, RAM & HUB

\$1949

U4929 | RENT \$21.85/wk*
see page 5



NEW

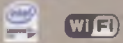
GREAT BONUS FROM SONY¹ELIGIBLE FOR
RENTSMART
CASHBACK²

VAIO SZ483NC SONY

- Intel® Core® 2 Duo Processor T7400 2.1GHz
- 2 x 1GB DDR2 RAM
- 160GB* Hard Drive
- DVD SuperMulti ±Dual Layer Drive
- 13.3" WXGA Clear Bright LED Widescreen
- nVidia GeForce Go 7400 with up to 335MB TurboCache
- Wireless LAN 802.11a/b/g
- Bluetooth v2.0
- Weighs 1.7kg
- Up to 6.5 hours of battery life
- Microsoft Windows Vista Business
- 1 year warranty

PRE ORDER NOW FOR EARLY
JUNE DELIVERY

\$3699



U8276 | RENT \$38.82/wk*

\$300
CASHBACK
WHEN YOU
RENTSMART
\$1750 OR MORE

*See page 2
for details* Available capacity of hard drive
may be less due to preinstalled
software

¹ Bonus offer available from
28/05/07 to 30/06/07
by redemption from Sony
only. Terms, conditions and
redemption information available
at www.sony.com.au/vaiogift

² Cashback available from 01/06/07
to 30/06/07 or while stocks last,
via redemption from Acer. See
acer.ht.com.au for details. Postage
charges may apply.

³ Available from 01/05/07 to
30/06/07 or while stocks last.
Not available in conjunction with
any other offer. \$99 monitor is
only available when purchased in
conjunction with an eligible Lenovo
notebook. Limit to one monitor per
notebook.

* Refer to back page for
Rentsmart terms & conditions.

Notebooks

NEW Intel® Centrino® Duo Processor Technology Offers..

TravelMate 5720G

NEW Generation Intel® Centrino® Duo Processor Technology is here!
Perfect for Small Business

- Intel® Core® 2 Duo Processor T7300 2GHz
- 1GB DDR2 RAM
- 160GB* Hard Drive
- DVD SuperMulti Dual Layer Drive
- 15.4" WXGA Widescreen
- ATI Radeon X1700 with up to 512MB HyperMemory
- Wireless LAN 802.11a/g/n & Bluetooth v2.0
- Up to 3 hours of battery life
- Weighs 3kg
- Microsoft Windows Vista Business
- 1 year warranty

\$1999

U7902 | RENT \$22.41/wk*

Microsoft Office Bundles also available. Call 1300 13 9999 to enquire.



BONUS BAG

POWERFUL DEDICATED GRAPHICS

ELIGIBLE FOR
RENTSMART
CASHBACK²

GREAT VALUE, GREAT TECHNOLOGY

NEW

BONUS BAG

\$199 CASHBACK²

Extensa EX4200

- Intel® Celeron M 440 1.8GHz
- 512MB DDR2 RAM
- 80GB* Hard Drive
- DVD SuperMulti Dual Layer Drive
- 14.1" WXGA Widescreen
- Wireless LAN 802.11b/g
- Weighs 2.4kg
- Microsoft Windows Vista Home Basic
- 1 year warranty

acer

\$998 \$799 AFTER
CASHBACK

U8346 | RENT \$11.55/wk*

VERSATILE MOBILE PERFORMANCE

EXCLUSIVE



nx6325

- AMD Turion 64 X2 TL-60 2GHz
- 1GB DDR2 RAM
- 120GB* Hard Drive
- DVD SuperMulti ±Dual Layer Drive
- 15" XGA Screen
- ATI Radeon Xpress 1150 with up to 128MB shared
- Wireless LAN 802.11b/g
- Weighs 2.7kg
- Up to 3 hours battery life
- Microsoft Windows Vista Business
- 1 year warranty

\$1499

U5537 | RENT \$16.81/wk*

Also available with
Windows XP Professional | U7683

optional accessories

Targus Radius Top Loader
(15.4")

\$99 | 20384

512MB RAM Upgrade for
all advertised models
\$89 | U6923

optional accessories

Samsung 940BW 19"
Widescreen LCD Monitor
\$330 | U2943Samsung 206BW 20"
Widescreen LCD Monitor
\$529 | U5892

Windows Vista Business + Intel® Centrino® Duo Technology, Better Together

6710b

Brand NEW Intel® Centrino® Duo Processor Technology has arrived!
More Performance. More Freedom. More Bandwidth

- Intel® Core™ 2 Duo Processor T7300 2GHz
- 2 x 1GB DDR2 RAM (including bonus 1GB)
- 120GB* Hard Drive
- DVD SuperMulti Dual Layer Drive
- 15.4" WXGA Widescreen
- Intel GMA X3100 Graphics
- Wireless LAN 802.11a/g/n & Bluetooth v2.0
- Up to 4.25 hours of battery life
- Weighs 2.6kg
- Microsoft Windows Vista Business
- 1 year warranty

\$1899

U8056 | RENT \$21.29/wk*

Also available with
Windows XP Professional | U8057



NEW & EXCLUSIVE

**BONUS 1GB RAM,
Bag, Mouse & Hub!**

ELIGIBLE FOR
RENTSMART
CASHBACK^

BUY HP 6710b + MICROSOFT OFFICE AND SAVE

BUNDLE 1

Notebook + Office 2007 Basic | \$2149

BUNDLE 2

Notebook + Office 2007 Small Business | \$2249

BUNDLE 3

Notebook + Office 2007 Professional | \$2349

Microsoft Office software bundle options are available
with hp 6710b notebook installed with Vista Business or
XP Professional as advertised.



DESIGNED WITH TOSHIBA RELIABLE TECHNOLOGIES FOR BUSINESS

POWERFUL DEDICATED GRAPHICS

POWERFUL TRUE DESKTOP REPLACEMENT

BONUS Bag, Mouse & Hub

Special \$99 19" LCD Monitor³

BONUS BAG

Tecra A8

TOSHIBA

- Intel® Core™ 2 Duo Processor T5600 1.8GHz
- 1GB DDR2 RAM
- 80GB* Hard Drive
- DVD SuperMulti ±Dual Layer Drive
- 15.4" WXGA Widescreen
- Wireless LAN 802.11a/b/g
- Weighs 2.9kg
- Up to 4 hours battery life
- Microsoft Windows Vista Business
- 1 year warranty

\$1949

U4929 | RENT \$21.85/wk*

Toshiba
EasyGuard



N200

lenovo

- Intel® Core™ 2 Duo Processor T7300 2GHz
- 2 x 512MB DDR2 RAM
- 120GB* Hard Drive
- DVD Multiburner Dual Layer Drive
- 15.4" WXGA Widescreen
- nVidia GeForce Go 7300 with up to 128MB TurboCache
- Wireless LAN 802.11a/g/n & Bluetooth v2.0
- Weighs 2.9kg
- Up to 3 hours of battery life
- Microsoft Windows Vista Business
- 1 year warranty

\$1999

U8282 | RENT \$22.41/wk*



TravelMate 5625WSMi

acer

- Intel® Core™ 2 Duo Processor T7200 2GHz
- 2 x 1GB DDR2 RAM
- 200GB* Hard Drive
- DVD SuperMulti ±Dual Layer Drive
- 17" WXGA Widescreen
- nVidia GeForce Go 7300 with up to 256MB TurboCache
- Wireless LAN 802.11a/b/g
- Bluetooth v2.0
- Integrated 1.3 megapixel Orbicam
- Microsoft Windows Vista Business

\$2499

U8517 | RENT \$27.10/wk*

Also available with
Windows XP Professional | U8518



optional accessories

Toshiba Docking
Station
\$275 | T5500



**1GB RAM UPGRADE for
all advertised models**
\$179 | U6922

Brilliant Value \$99 19" Widescreen LCD Monitor³

³Purchase select Lenovo Notebooks
from 01/06/07 to 30/06/07 and be
eligible to purchase a 19" Widescreen
LCD Monitor for \$99. Only one
monitor per notebook.
\$99 | U5751

optional accessories

Targus Ultra Mini Hub
\$36 | F0749



**Harris Technology 3 Year Extended
Warranty Plan - Protect your
investment for peace of mind!**
\$239 | S0601 (Up to \$2000 notebook)
\$289 | S0602 (Up to \$4000 notebook)

Desktop & Display

Great value Desktop and Display offers...

VT-49

NEC

- LCD Technology
- SVGA resolution (800 x 600)
- 1600 ANSI Lumens
- 600:1 contrast ratio
- 3000 hours lamp life
- Multiple input terminals
- Weight: 2.8kgs
- Integrated speakers
- 2 years limited warranty

\$919

U1308 | RENT \$10.63/wk



VT-490

- LCD Technology
- SVGA resolution (800 x 600)
- 2000 ANSI Lumens
- 600:1 contrast ratio
- 2000 hours lamp life
- Wall colour correction
- Security function; quick start and power off function
- Weight: 2.9kgs
- Integrated speakers
- Includes carrying case, lens cover and handle strap
- 2 years limited warranty†

\$1149

U1309 | RENT \$13.29/wk*

*See back cover for Rentsmart terms & conditions

†Available capacity of hard drive may be less due to preinstalled software.

‡Warranty conditions apply.

§3 years part and labour quality assurance warranty with 90 day lamp & faulty product replacement

¶Bonus available from 01/06/07 to 30/06/07 or while stocks last.

\$300

CASHBACK
WHEN YOU
RENTSMART
\$1750 OR MORE

^See page 2 for details



732N

SAMSUNG



- Viewable Image : 17"
- Interface: Analogue
- Resolution: 1280 x 1024
- Response Time: 5ms
- Contrast Ratio: 700:1
- Brightness: 300 nits
- Ball Hinge Technology
- Warranty: 3 years onsite exchange and zero dead pixel policy

\$299

BLACK | U6217

WHITE | U6451



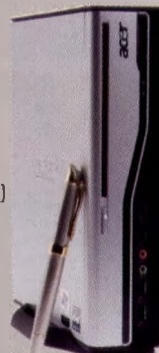
AcerPower 1000 USFF

acer

- Processor: AMD Athlon 64 X2 Dual-core processor
- Memory: 1GB DDR2 533MHz SODIMM Dual Channel
- Hard Drive: 160GB* SATA (7200RPM)
- Optical Drive: 16 x DVD+-RW
- Graphics: Integrated nVidia GeForce 6150 graphics
- Operating System: Windows XP Professional (Service Pack2)
- Compact: only weighs 2.6kgs
- Warranty: Acer power 1 year standard onsite

\$1099

U4580 | RENT \$12.72/wk*



As above (U4580) except:

- Processor: AMD Athlon 64 X2 Dual-core
- Memory: 2GB DDR2 533MHz SODIMM Dual Channel
- Hard Drive: 250GB* SATA (7200RPM)

\$1299

U8095 | RENT \$15.03/wk*

As above (U4580) except:

- Processor: AMD Athlon64 3500+ T180
- Memory: 512MB DDR2 533 SODIMM
- Hard Drive: 80GB* SATA (7200RPM)
- Operating System: Windows Vista Home Basic

\$799

U6904 | RENT \$9.24/wk*

optional accessories



Ergotron LX Dual Monitor Lift Stand
\$349 | U6007

TOSHIBA

TLP-X2000

- LCD technology
- XGA resolution (1024 x 768)
- 2000 ANSI Lumens
- 400:1 contrast ratio
- Weight: 2.5kgs
- Projection format: 4:3 switchable to 16:9
- Password security and control Panel Lock
- Includes carry case and remote with laser pointer
- 3 year warranty

\$1749

T8677 | RENT \$19.61/wk*

Also available:
TLP-X3000 | \$2599 | U5344



BONUS 84" PROJECTOR SCREEN

TOSHIBA

TDP-T45

- DLP Technology
- XGA resolution (1024 x 768)
- 2500 ANSI Lumens
- 2000:1 contrast ratio
- Weight: 3kgs
- Projection format: 4:3 switchable to 16:9
- Integrated speakers
- Includes soft case and remote
- 3 year warranty†

\$2249

T8919 | RENT \$24.39/wk*



BONUS 84" PROJECTOR SCREEN

NEC

Hanover
LCD190V

- Viewable Image: 19"
- Interface: Analogue
- Resolution: 1280 x 1024
- Response Time: 8ms
- Contrast Ratio: 550:1
- Brightness: 270 nits
- Warranty: 3 years limited warranty

\$345

U5329



Toshiba Projector Screen
\$389 | S9635



VPL-EX4

SONY

3LCD

**BONUS WIRELESS
PRESENTATION TOOL**



NEW

ELIGIBLE FOR
RENTSMART
CASHBACK*

- 3LCD Technology
- XGA resolution
- 2100 ANSI Lumens
- Macintosh® compatible
- Multiple inputs
- Password security and control panel lock
- Quick Start-up
- 2 years limited warranty†

\$1895

U8285 | RENT \$21.25/wk*

940BW

- Viewable Image: 19" Wide
- Interface: Analogue / Digital
- Resolution: 1440 x 900
- Response Time: 4ms
- Contrast Ratio: 500:1
- Brightness: 300 nits
- Wall mountable and Height adjustable
- Warranty: 3 years onsite exchange and zero dead pixel policy



\$330

BLACK | U3759
SILVER | U2943

DX2250



**BONUS MAXTOR 160GB
EXTERNAL HARD DRIVE**

- Processor: AMD Athlon 64 X2 Dual Core 3800 Processor
- Memory: 1GB (2x512MB) PC2-5300 DDR2-667
- Hard Drive: 160GB* SATA (7200RPM)
- Optical Drive: 16x Dual Layer DVD±RW
- Graphics: ATI Radeon X300 graphics
- Operating System: Microsoft Windows Vista Business 32bit
- Warranty: 1 year parts and labour warranty
- Monitor: HP L1906 19" LCD Monitor

\$1299

U8338 | RENT \$15.03/wk*

AL1916S

acer

- Viewable Image : 19"
- Interface: Analogue
- Resolution: 1280 x 1024
- Response Time: 8ms
- Contrast Ratio: 500:1
- Brightness: 250 nits
- Warranty: 3 years limited



\$329 | T4734

SAMSUNG



226BW

- Viewable Image: 22" Wide
- Interface: Analogue / Digital
- Resolution: 1680 x 1050
- Response Time: 2ms
- Contrast Ratio: 3000:1
- Brightness: 300 nits
- Tilt adjustment and swivel adjustment
- Warranty: 3 years onsite exchange and zero dead pixel policy



\$649 | 22" | U5893 | RENT \$7.51/wk*

\$529 | 20" | U5892

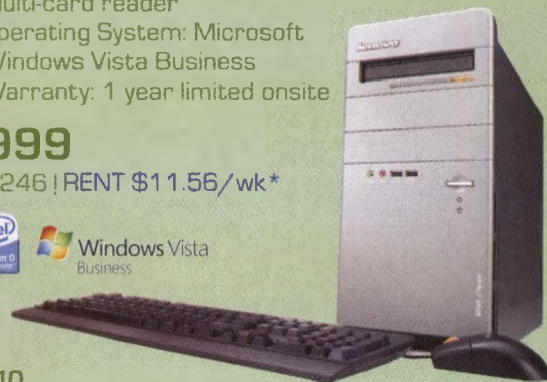
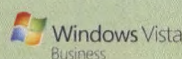
J110

lenovo

- Processor: Intel Core 2 Duo E4300
- Memory: 1GB (2 x 512MB) DDR2 SDRAM
- Hard Drive: 250GB* SATA (7200RPM)
- Optical Drive: 16x DVD±RW
- Graphics: 256MB Intel Graphic Media Accelerator 3000
- Multi-card reader
- Operating System: Microsoft Windows Vista Business
- Warranty: 1 year limited onsite

\$999

U8246 | RENT \$11.56/wk*



J110

- Processor: Pentium D 925 (Dual-Core)
- Memory: 512MB DDR2 SDRAM
- Hard Drive: 80GB* SATA (7200RPM)
- Optical Drive: 16x DVD±RW
- Graphics: 256MB Intel Graphic Media Accelerator 3000
- Multi-card reader
- Operating System: Microsoft Windows XP Professional
- Warranty: 1 year limited onsite

\$849

U8245 | RENT \$9.82/wk*



optional accessories

Amicroe 1GB DDR2
667MHz RAM
\$159 | U7702



Microsoft Natural Ergonomic
Keyboard 4000 | \$79 | T0577

Lacie 8GB USB
Pocket Drive
\$199 | U4200



Western Digital Passport
160GB Portable Hard Drive
\$199 | U5600



Microsoft Office
Professional 2007
\$849 | FULL | U1830
\$549 | UPGRADE | U1831

SPH200D Dual-Mode Cordless Phone **NETGEAR**

- Make Free Skype calls to other Skype users without a PC
- Use SkypeOut to make long distance calls*
- Crystal clear reception with DECT technology
- Expandable up to 4 handset off one base station

**NEW****\$320** | U8072

Also available:

SPH150D Additional Handset | \$169 | U8073**WDECT 2315 Cordless Phone****Uniden**
SOUNDS BETTER

- Multi handset capabilities
- Alpha display Caller ID with 100 caller ID memories with phone book
- Speakerphone on handset two-way communication between handsets anywhere without the base
- 2.4GHz WDECT wideband digital technology
- Polyphonic tones
- Room/baby monitor

**SAVE \$10****\$79** | U0402

* Refer to back page for Rentsmart terms & conditions.

* For calls made through Skype and/or the SkypeOut service. Terms and conditions of the Skype services are subject to change at any time in the sold discretion of Skype Limited.

*Capacity of hard drive may be less due to pre-installed software

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You can now quickly search for and order our entire range of more than 15,000 technology products online at ht.com.au.

Click and try it out today.

XDA Atom Exec

- Intel PXA272 520MHz
- Flash ROM: 192MB in total
- 2 megapixel camera
- 2.7" TFT LCD display with touch panel
- Built-in Wi-Fi and Bluetooth Wireless technology
- Window Mobile 5.0 with Messaging and Security Feature Pack
- Tri-band GSM/GPRS/EDGE: GSM900, GSM1800, GSM1900

**HOT PRICE****\$699**

T8955 | RENT \$8.09/wk*

DSS7815+1 DECT Cordless Phone**Uniden**
SOUNDS BETTER

- 5.8GHz Digital Spread Spectrum
- Designed and engineered in Japan
- Advanced LCD and caller ID display
- Multi handset capable (up to 10) 2 handsets included
- Wireless network friendly
- Digital duplex speakerphone on handset
- Handset conferencing

**SAVE \$20****\$179** | U0307**F20 Portable GPS Navigator****NAVMAN**

Simple, color-coded easy to use interface

- 3.5" touch screen
- Nearest fuel and parking buttons
- Slim, lightweight design
- Speed and red light camera warnings (via optional connectivity pack)

**SAVE \$50****\$449** | U0755**Digiwalker A701 Phone/PDA/GPS****mio**
Dig Walker

- Intel® PXA-270 520MHz
- Memory: 128MB Nand Flash / 64MB SDRAM
- GSM Tri Band GSM/GPRS
- GPS Built-in GPS module SiRFStar III chipset
- SD/MMC SD/IO, MMC-compatible
- Video Display 2.7" Touchscreen TFT LCD
- Resolution: 320 x 240, 65K colours, portrait
- Connectivity USB 1.1, Bluetooth® 1.2
- Camera Fix Focus 1.3 megapixel CMOS

**BUILT IN GPS RECEIVER****\$1099**

U4702 | RENT \$12.71/wk*

DSS7960+1 Dual Line Phone**Uniden**
SOUNDS BETTER

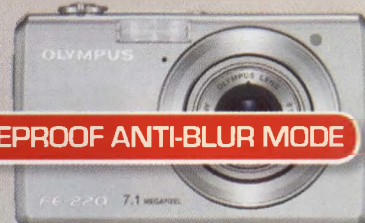
- Distinctive caller ID indicators
- Digital duplex speakerphone on handset
- 2 line dual keypad cordless phone
- 5.8GHz digital spread spectrum technology phone system
- Multi (10) handset capable (2 handsets included)

**BONUS HEADSET****\$269** | U4664

Also available:

Uniden HS910 Headset | \$29.95 | U0574**FE-220****OLYMPUS**

- 7 megapixel
- 3 x optical zoom
- 2.5" LCD screen
- Super slim with Li-Ion Rechargeable battery
- Movie mode with sound and digital sound
- Olympus Precision optics

**SHAKEPROOF ANTI-BLUR MODE****\$299** | U5434


\$696 PRICE DROP!
PRICE BREAKTHROUGH


GREAT VALUE ENTRY LEVEL SERVER

SBS Server Bundle ProLiant ML110G4

- Dual-Core Intel Pentium D Processor 820 2.8GHz-800Mhz-2x1MB L2 Cache
- 2 x 160GB* Non Hot Plug SATA Hard Disk Drive
- 1GB PC2-5300 ECC (DDR2-667Mhz) Memory
- Embedded 4 port SATA Controller with embedded RAID
- 48x CD-ROM
- Microsoft Windows Small Business Server Standard Edition R2


\$999

U3865 | RENT \$11.56/wk*

EVA8000 HD Digital Entertainer

NETGEAR

- Streams movies, videos, music, internet radio, and photos from your home PCs and storage devices to your HDTV
- Automatically finds all the digital media files on your home network and organises them into an easily accessible library

**BONUS WIRELESS
ACCESS POINT**
\$679 | U7492


Terastation Pro II NAS 1TB Business Server Edition

BUFFALO

- Ultra-fast data transfer rates of up to 35MB/s - more than twice the speed from TeraStation PRO
- Distributed file system support- allows multiple TeraStation to work seamlessly together as one unit


\$1399
SAVE \$200

U5985 | RENT \$20.17/wk*

DIR-635 RangeBooster N 650 Wireless Router


SAVE 10%


- GoS Engine and Draft 802.11n technology for total network performance
- Active firewall and WPA2™ to protect your network against outside intruders
- Provides greater wireless signal rates even at farther distances for best-in-class whole home coverage

\$219 | T9473

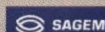
WRT350N Wireless-N Gigabit Router with Storage Link



- Internet-sharing Router and 4 port Gigabit Switch, with a built in speed and range enhanced Wireless Access Point
- Up to 12 times faster than Wireless G, but also works great with Wireless G and B devices

BONUS 4GB USB KEY
\$349 | U7882


My Du@l Radio 700 Wireless Media Server/MP3 player



- WiFi Internet Radio
- FM Radio - RDS
- Media Server
- USB MP3 Player
- Alarm

NEW!

\$299 | U7959

optional accessories

**D-Link DWA-547 RangeBooster N
650 Wireless LAN PCI Adapter**
\$125 | T9470

SAVE 10%
**D-Link DWA-645 RangeBooster N
650 Wireless LAN PCMCIA Card**
\$149 | T9472

SAVE 10%

optional accessories

**Belkin Gold Series 8-Way (2m Cord)
+ TEL + \$250,000 Warranty**
\$123 | N3352

**Belkin SOHO Series UPS Serial &
USB 350VA - \$50,000 Warranty**
\$160 | N4911

4 Port Slim KVM

SERVERLINK

Control 2/4 computers from one keyboard, monitor and mouse. Ideal for individual and SOHO use


\$99 | Q5543

SAVE \$58

diNovo Media Bluetooth Laser Desktop



- Bluetooth MediaPad — long range Bluetooth remote commander
- Combines a numeric pad, calculator and remote control
- LCD display and rechargeable MX Laser mouse



\$329 | T3582

Harmony Advanced Universal Remote 1000i



This is the ultimate device to control even the most complex home entertainment systems.

- Brilliant 3.5" (9cm) touchscreen - The Harmony 1000i offers ease of use with large, colorful icons on a clear touch screen
- One-touch Activity Control - Simply touch the icon and the Harmony remote powers on your devices, sets all the inputs and even presses play!
- Easy computer-based set up - Connect the Harmony 1000i to your computer and the wizard guides you through an internet-based set up
- Battery saving rechargeable lithium-ion battery



\$214 OFF
HOT PRICE

\$485 | U5173

*See page 16 for Rentsmart terms & conditions.

*20% cash back offer is valid from 01/05/07 until 31/07/07 on selected Microsoft Hardware Products, see microsoft.ht.com.au for full terms and conditions. Postage charges may apply.

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Click and try it out today.

Computer Accessories

All your computer peripheral needs covered

My Book Pro 1TB External Hard Drive



- 1,000GB of storage
- USB 2.0/Firewire 400/Firewire 800
- Capacity gauge
- RAID
- EMC® Retrospect® Express Backup and System Recovery Software



\$749

U5601 | RENT \$8.66/wk*

500GB Gigabit/Ethernet Hard Drive



- Gigabit Ethernet & USB2.0 interface
- Quick & easy IP configuration
- Expandable capacity through a USB host port
- Users 7 share level permissions
- Jumbo Frame support



SAVE \$30

\$399 | U4961

1TB BigDisk Extreme



- FireWire 800, FireWire 400, Hi-Speed USB 2.0
- Built-in RAID 0 for Extreme FireWire 800 speed
- Convenient: Plug & play, stack, rack-mount or stand upright
- Heat-dissipating, ultra-quiet, compact metal design
- One Click back up software for PC & Mac



SAVE \$30

\$769

T6655 | RENT \$8.90/wk*

One Touch III 80GB Mini Edition



- Easy backup of your data with the Maxtor OneTouch button
- USB 2.0 and 1.1 compliant interface
- 5400RPM 8M Cache



\$129 | U6810

Bluetooth Laser Cordless Desktop MX5000



- The smart desktop that combines an LCD keyboard display, high-speed Bluetooth wireless hub with SecureConnect technology
- Comes with innovative touch-sensitive media controls



\$245 | T3579

Optical Desktop Elite



- High performance Wireless Bluetooth desktop
- Features ultimate Keyboard & Mouse navigation with Tilt Wheel Technology
- Perfect with Media Center Edition PCs



20% CASHBACK OFFER*

\$199 | P7009

desktop accessories

Verbatim CD-R 52x
700MB/80Min
100Pk Spindle
\$19.95 | Q6476



SAVE \$20

Imation DVD 50Pk | \$24.95
DVD R+ | U8444
DVD R- | U8447



HOT PRICE

Sandisk 2GB miniSD Card
\$39.99 | T6172

NEW - LOW PRICE



Sandisk Ultra II 2GB
CompactFlash Card
\$64.99 | N9758



NEW - LOW PRICE

Porsche Design 500GB External Hard Drive
LACIE

- Hi-Speed USB connection
- 7200 RPM 8MB Cache
- Save photos, MP3s, data files
- Stackable to save desk space
- Back up valuable information

SAVE \$20

\$279 | T9416

1TB BigDisk External Hard Drive

- Gigabit Ethernet and USB2.0 interface
- Expandable capacity through a USB host port
- Users and share level permissions
- Stream your photos, music and videos
- Full support for Windows, Mac & Linux
- Simple set-up with a quick Wizard Install

\$549 | U8168

LACIE
SAVE \$100
ONLY 55 CENTS A GB
160GB External Portable Hard Drive
LACIE

- Large 160GB storage capacity
- Hi-Speed USB 2.0
- 4 pin USB, 5400 RPM, buffer: 2MB
- Ultra portable slim design
- Sturdy metal casing


\$189 | U4680

Shared Storage II 320GB External Hard Drive
Maxtor

- Access files including digital video, music, and photos from any networked PC or Mac for enhanced productivity
- Seamless workflow and easy file sharing and printing
- Gigabit Ethernet port for network accessing
- Two USB 2.0 ports for printer sharing, storage, expansion or offsite data rotation

\$349 | U4996

HOT PRICE
\$150 PRICE DROP
Cruzer Titanium U3 4GB USB Flash Drive
SanDisk

- Capacities available: 1GB, 2GB and 4GB
- Performance: 15MB/s read speed and 9MB/s write speed
- Stylish Liquidmetal® body
- Crush force exceeds 2000lbs
- Laser etched graphics and finish


NEW LOW PRICE
\$99 | U5599

8GB Pocket Disk USB 2.0

- Slim design
- Lightweight and compact
- Low cost data storage
- Large 8GB capacity, store your DVD's on a flash drive
- Provides security zone software, which lets you partition the memory and specify a password to protect the data you want to keep private

\$169 | U7845

shintaro
NEW
MASSIVE 8GB
SUPER HOT PRICE
desktop accessories
Microsoft Wireless Notebook Presenter Mouse 8000
\$149 | U4249

20% CASHBACK OFFER!
Logitech Cordless 2.4 GHz Presenter
\$89 | S8331

SAVE \$10
Toshiba 4GB U3 USB drive
\$64.99 | U8256

NEW - HOT PRICE
Sandisk High Capacity 4GB SD Card & Reader
\$99.99 | U6287

Seagate Barracuda 500GB PATA Drive
\$294 | U5323

SAVE \$70
Seagate Barracuda 320GB SATA Drive
\$169 | T9020

HOT PRICE


Printers

All your printing needs covered..



\$100 CASHBACK & 30 Day Money Back Guarantee¹

Pro K5400DTN



- Print speed: up to 36ppm mono/ 35ppm colour
- Print Resolution: 4800 dpi colour
- Duplex (dual sided) printing
- Total Media Capacity: 600 sheets
- PCL 3 support
- Extra paper tray (total paper holding 600 pages)
- Connection: hi-speed USB, Ethernet 10 Base-T/100 Base-TX
- Duty Cycle: 7500 pages/month

\$379 | U7751

\$279 AFTER CASHBACK

¹ Offer valid on purchases between 01/05/07 to 30/06/07. Visit hp.ht.com.au for more details.

² Cashback via redemption from Epson from 01/05/07 to 31/07/07. See epson.ht.com.au for details.

³ Offer valid on purchases between 01/05/07 and 30/06/07. Via redeprmtion from Fuji Xerox. See fujixerox.ht.com.au for details.

⁴ Offer valid on purchases between 01/05/07 to 30/06/07. Visit hp.ht.com.au for more details.

⁵ Via redemption from HP between 01/05/07 to 30/06/07. See hp.ht.com.au for details.

⁶ Cashback via redemption from Brother from 01/05/07 to 30/06/07. See brother.ht.com.au for details.

^{*} Refer to back page terms & conditions including Rentsmart

Postage charges may apply on all redemptions.

MFC665CW

brother

- Printer/copier/scanner/fax
- Print speed: up to 20ppm (mono) / up to 18ppm (colour)
- Scan Resolution: 600 x 2400 dpi
- Standard Media Capacity: 100 sheets
- Memory: 16MB
- Connection: USB, Ethernet 10 Base-T/100 Base-TX, IEEE 802.11b, IEEE 802.11g
- Warranty: 1 year

SAVE \$20

\$279 | U5346



ImageClass MF5770 All in One

Canon
advanced simplicity

- Printer/copy/scan/fax
- Print & Copy Speed: up to 20 ppm
- Print Resolution: up to 1200 x 600 dpi
- Scan Resolution: 1200 x 2400 dpi
- Total Media Capacity: 250 sheets
- Connection: Hi-Speed USB, Ethernet
- Warranty: 1 year

\$559 | S8188



Docuprint C525A

X FUJI XEROX

- Print Speed: up to 25ppm, mono / 5ppm, colour
- Print resolution: 600 x 600 dpi
- Total Media Capacity: 200 sheets
- Connectivity: parallel, USB, Ethernet
- Memory: 64MB
- Monthly Duty Cycle: 45000 pages
- Warranty: 1 year

\$449 | R6445

\$349 AFTER CASHBACK



\$100 CASHBACK³

Stylus RX650

EPSON
BACKED YOUR VISION

- Printer/copier/scanner
- Print & copy speed: up to 21ppm mono/colour
- Print Resolution: up to 5760 x 1440 dpi
- Scan Resolution: 3200 x 6400 dpi
- Standard Media Capacity: 80 sheets
- Connection: USB, IrDA
- 2.5" display
- Warranty: 1 year

\$449 | T5919

\$319 AFTER CASHBACK



\$130 CASHBACK²

Officejet L7580

hp
TAKES

Scan to memory card / USB Key

- Print & Copy Speed: up to 35 ppm (colour)
- Print Resolution: up to 4800 x 1200 dpi
- Scan Resolution: up to 2400 x 4800 dpi
- Connection: USB, Ethernet 10 Base-T
- Warranty: 1 year

\$499 | U8052

\$399 AFTER CASHBACK



\$100 CASHBACK & 30 Day Money Back Guarantee¹

LaserJet 2600N

hp
TAKES

- Print Speed: up to 8ppm mono/8ppm colour
- Print Resolution: 600 x 600 dpi
- Total Media Capacity: 250 sheets
- Memory: 16MB
- Connection: Hi-Speed USB, Ethernet 10/100Base-TX
- Monthly Duty Cycle: 35000 pages
- Warranty: 1 year

\$529 | S2505

\$429 AFTER CASHBACK



\$100 CASHBACK⁴

5% OFF
INK OR TONER

Buy any printer in June 2007 and receive 5% discount off the ink or toner for that printer until July 2007



Offer not available online.

Laserjet 3055 All in One


- Printer/copier/scanner/fax
- Print speed: up to 18ppm
- Print Resolution: up to 1200 x 1200 dpi
- PCL 5e, PCL 6, PostScript 3 support
- Scan resolution: 600 dpi
- Hi-speed USB, Ethernet
- Warranty: 1 year


\$100 CASHBACK⁴
\$749

T4390 | RENT \$8.66/wk*

\$649 AFTER CASHBACK
Colour LaserJet 2840


- Printer/copier/scanner/fax
- 7-in-1 card reader
- Print speed: up to 19ppm mono/4ppm colour
- Print Resolution: up to 600 x 1200 dpi (mono)/ up to 600 x 600 dpi (colour)
- Scan Resolution: 1200 x 1200 dpi
- Connection: hi-speed USB, Ethernet
- Warranty: 1 year onsite
- Windows and Mac compatible


BONUS COLOUR TONER PACK⁵
\$1399

S1217 | RENT \$15.69/wk*

Laserjet P2015N


- Print Speed: Up to 26ppm A4
- Print Resolution: up to 1200 x 1200 dpi
- Total Media Capacity: 300 sheets
- Memory: 32MB (expandable 288MB)
- Connection: Hi-Speed USB, Ethernet (embedded print server)
- Monthly duty cycle: 15,000 pages per month
- Warranty: 1 year


\$699

U4728 | RENT \$8.09/wk*

MFC-9420CN


- Printer/copier/scanner/fax
- Print & Copy Speed: up to 31ppm mono/8ppm colour
- Print Resolution: up to 600 x 600 dpi (mono)/up to 600 x 600 dpi (colour)
- Scan Resolution: 1200 x 2400 dpi
- Standard Media Capacity: 250 sheets
- Connection: Parallel, hi-speed USB, Ethernet
- 10 Base-T/100 Base-TX
- Warranty: 1 year onsite


\$200 CASHBACK⁶
\$1199 **\$999 AFTER CASHBACK**

T4070 | RENT \$13.87/wk*

CLP-300N


- Print Speed: up to 16ppm mono A4/4ppm colour
- Print Resolution: 2400 x 600 dpi
- Total Media Capacity: 150 sheets
- Memory: 64MB
- Connection: USB, Ethernet
- Warranty: 1 year on site


SAVE \$20
BONUS BLACK TONER
\$479

U0104

CLX-2160n


- **World's Smallest Colour Laser Multifunction Printer** - designed to fit your desktop
- **Scan & Save Instantly** - scan to and print documents directly from your USB memory key
- **Easy-to-use Toner** - easy toner replacement system. No spills or waste.


\$749

U8093 | RENT \$8.66/wk*

WIN

ONE OF 4 EXCITING PRIZES



Buy any printer in June 2007 to automatically enter the draw to win one of 4 exciting home entertainment prizes - an LCD TV, home theatre or one of two great gaming consoles.

Visit printeroffers.ht.com.au for more details on how to enter and for full terms & conditions. Authorised under NSW Permit No. LTPS/07/20495 and ACT Permit No. TP 07/01852

FlyBuys

Bonus FlyBuys points with the purchase of QuickBooks Upgrades¹

¹ See pack for details

² Offer valid for QuickBooks Plus, Pro and Premier Upgrades only, purchased between 14/05/07 and 31/07/07. See quicken.ht.com.au for more details.

³ Purchase selected full or upgrade Microsoft Office 2007 or Windows Vista software between 14/05/07 and 31/07/07 to be eligible to receive either a Microsoft VX-1000 Webcam, Microsoft LX-3000 Headset or a HP Functional Printer from Microsoft. See microsoft.ht.com.au for more details.

⁴ Purchase selected Quicken software between 14/05/07 and 31/07/07 to be eligible to receive up to \$500 cashback from Quicken. See quicken.ht.com.au for more details. Cashback does not apply to upgrades.

⁵ Purchase specially marked Nuance software between 01/04/07 and 30/06/07 and be eligible to receive \$30 cashback by redemption from Nuance. See nuance.ht.com.au for more details. Cashback does not apply to upgrades.

⁶ Bonus offer exclusive to Harris Technology and Officeworks group. Offer extended to 31/07/07. Only available to customers that have up to 4 PCs or less in their business, does not extend to small business that have a server and require installation on a server. See specially marked boxes for full terms and conditions or visit www.smallbusinessoffers.com.au

⁷ Purchase a full version of MYOB Accounting 16 between 13/05/07 and 31/07/07 and be eligible to receive an Microsoft Wireless Optical Desktop 1000 by redemption from MYOB. See myob.ht.com.au for more details. Bonus does not apply to upgrades.

⁸ Purchase a full version of MYOB Accounting Plus 16 /with Cover or MYOB AccountEdge 6 between 13/05/07 and 31/07/07 and be eligible to receive an Microsoft Wireless Laser Desktop 4000 by redemption from MYOB. See myob.ht.com.au for more details. Bonus does not apply to upgrades.

⁹ Purchase a full version of MYOB Premier 10 or MYOB RetailManager 9 between 13/05/07 and 31/07/07 and be eligible to receive an Microsoft Wireless Laser Desktop 6000 by redemption from MYOB. See myob.ht.com.au for more details. Bonus does not apply to upgrades.

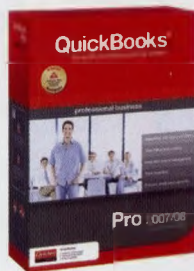
¹⁰ Purchase a full version of Trend Micro Internet Security 2007 between 01/06/07 and 31/07/07 to be eligible to receive a 1GB MP4 Player by redemption from Manacomm. See trendmicro.ht.com.au for more details. Redemption charges may apply to all redemptions.

Software

All your Tax Time needs covered...

QuickBooks Pro 2007/08

Quicken



- Time billing & job costing
- Integrated payroll management
- Compatible with Microsoft® Windows 2000/XP/Vista™
- 12 months free* technical phone support
- 12 months free* software upgrades

\$200 CASHBACK³

\$799 FULL | U5974

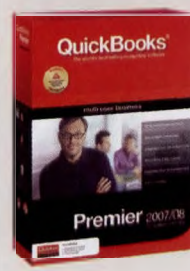
\$599 AFTER CASHBACK

\$499 UPGRADE | U6171



QuickBooks Premier 2007/08

Quicken



- Up to 3 simultaneous users
- Time billing & job costing
- Integration with Microsoft® Office
- Integrated payroll management
- 12 months free* technical phone support
- 12 months free* software upgrades

\$500 CASHBACK³

\$1299 FULL | U5978

\$799 AFTER CASHBACK

\$749 UPGRADE | U6173



Dragon NaturallySpeaking Preferred 9.0

NUANCE

Fast, easy and amazingly accurate, it's over three times faster than typing. Just use your voice to dictate and edit in Microsoft Word and Excel, Corel WordPerfect, and virtually all Windows-based applications.



\$30 CASHBACK⁴

\$369 | T9230

\$339 AFTER CASHBACK

Acrobat 8.0 Professional

Adobe

- Create and optimise Adobe PDF documents
- Streamline data collection with Adobe PDF forms
- Apply advanced document security and controls



SAVE \$24

\$675 | U1228



BONUS OFFER EXTENDED⁵
Valued at \$139

When you purchase **Vista Business Edition** (either upgrade or full)

YOU WILL RECEIVE
Transcend 1GB USB Drive with Ready Boost +

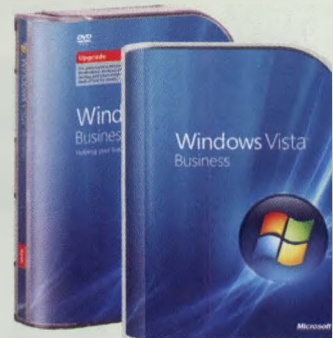
2 Months complimentary Online Training on Windows Vista Business supplied by Quickknowledge

Purchase **MICROSOFT OFFICE 2007** or **Windows Vista Business** to receive either a Microsoft VX-1000 Webcam, or

Windows Vista Business

Windows Vista

Windows Vista Business offers powerful new ways to organise, find, and share information while staying better connected whether you are in the office or on the road. For small businesses, Windows Vista Business will help keep PCs running smoothly and more securely.



\$379 | UPGRADE | U4504

\$565 | FULL | U4503

Accounting v16

- Record purchases and control your payables
- Generate current and future budgets



BONUS MICROSOFT WIRELESS OPTICAL DESKTOP 1000⁶

\$299 | U0169

\$239 UPGRADE | U0175

Accounting Plus v16

- MYOB Accounting Plus has the same business management features as MYOB Accounting. It also:
- Automates your pay runs
- Calculates PAYG withholdings



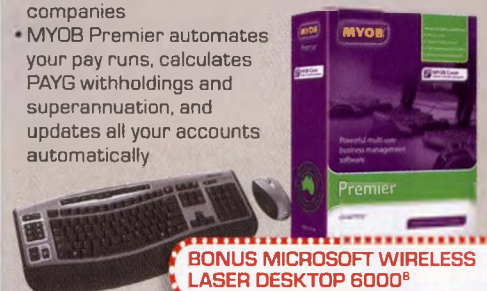
BONUS MICROSOFT WIRELESS LASER DESKTOP 4000⁷

\$475 | FULL | U0170

\$319 | UPGRADE | U0176

Premier v10

- Provides advanced inventory, payroll and business management capabilities to medium-sized companies
- MYOB Premier automates your pay runs, calculates PAYG withholdings and superannuation, and updates all your accounts automatically

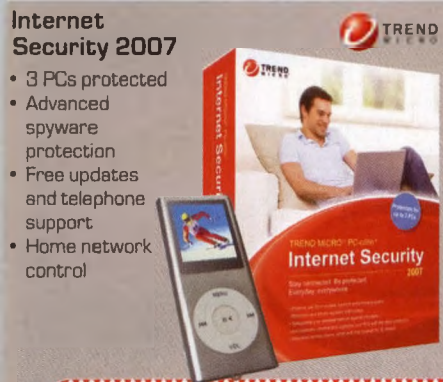


BONUS MICROSOFT WIRELESS LASER DESKTOP 6000⁸

\$1395 | U0172

Internet Security 2007

- 3 PCs protected
- Advanced spyware protection
- Free updates and telephone support
- Home network control

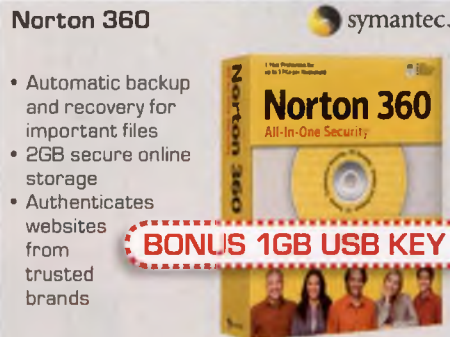


BONUS 1GB MP4 PLAYER⁹

\$99 3 USER | U0389

Norton 360

- Automatic backup and recovery for important files
- 2GB secure online storage
- Authenticates websites from trusted brands

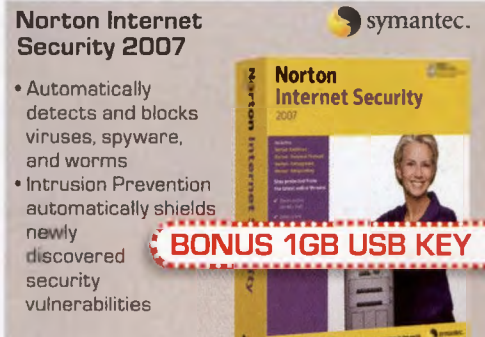


BONUS 1GB USB KEY

\$129 3 PCS | U8193

Norton Internet Security 2007

- Automatically detects and blocks viruses, spyware, and worms
- Intrusion Prevention automatically shields newly discovered security vulnerabilities



BONUS 1GB USB KEY

\$99 3 PCS | U8194

VISTA system software between 15th May 2007 and 31st July 2007 and be eligible for a X-3000 Headset or a HP Functional Printer²

Office Small Business 2007

Microsoft Office Small Business 2007 is the complete, powerful and easy-to-use productivity and contact management suite. Includes Microsoft Word 2007, Excel 2007, PowerPoint 2007, Outlook 2007 with Business Contact Manager and Publisher 2007.

\$499 | UPGRADE | U1828 **\$749** | FULL | U1827

Office Professional 2007

Microsoft Office Professional 2007 is a powerful suite of productivity and information management software to help business professionals save time and stay organised. Includes all the features of Office Small Business Edition, as well as Microsoft Office Access 2007.

\$549 | UPGRADE | U1831 **\$849** | FULL | U1830



BONUS OFFER EXTENDED⁵ Valued at \$229

When you purchase
Office 2007 Small Business Edition
(either upgrade or full)
or **Office 2007 Professional Edition**
(either upgrade or full)

YOU WILL RECEIVE

- 1 hour onsite installation from Quickknowledge +
- 2 Months complimentary Online Training on Microsoft Office supplied by Quickknowledge

1 - 30 June 2007



Windows Vista
Business

**BONUS MAXTOR 160GB
EXTERNAL HARD DRIVE¹**

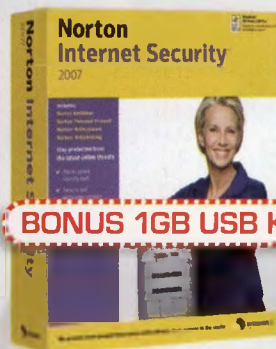
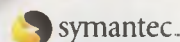
DX2250

\$1299

U8338

RENT \$15.03/wk*

¹See page 7



BONUS 1GB USB KEY²

**Norton Internet Security
2007 3 PC**

\$99 | U8194

²See page 15

ELIGIBLE FOR
RENTSMART
CASHBACK[^]

Windows Vista
Business

acer



BONUS BAG³

POWERFUL DEDICATED GRAPHICS

TravelMate

5720G

\$1999

U7902 | RENT \$22.41/wk*

³See page 4

WIN

ONE OF 4 EXCITING PRIZES⁴



Buy any printer in June 2007 to enter the draw to win one of 4 exciting home entertainment prizes - an LCD TV, home theatre or one of two great gaming consoles.

Authorised under NSW permit No. LTPS/07/20495 and ACT permit No. TP 07/01852. Visit printeroffers.ht.com.au for details.

⁴See page 13

LOCATIONS | NSW - North Ryde 45 Epping Rd, **North Sydney** - G Floor Bayer Building 275 Alfred St, **Parramatta** 46 George St, **Alexandria** Unit 1/110 Botany Rd | **VIC - Hawthorn East** 612 Burwood Rd | **ACT - Fyshwick** 29-31 Townsville St | **QLD - Fortitude Valley** 356 St Pauls Terrace | **WA - Osborne Park** 426 Scarborough Beach Rd, **Cannington** 1359 Albany Hwy

STORE TRADING HOURS | Monday - Friday | North Ryde & Hawthorn 8am - 7pm, All other stores 8am - 6pm
Saturday | 9am - 5pm **Sunday** | 10am - 5pm (WA closed)

All purchases subject to Terms and Conditions & Returns Policy. No further discounts available. Limited Stock. No dealers. Delivery charges additional. Please call 1300 13 9999 or see delivery.ht.com.au for details. Offer available from 01/06/07 until 30/06/07. Not available in conjunction with any other offer. [^]See page 2 for RentSmart promotional details. *The RentSmart figures quoted are based on a per week basis over 3 years. Terms and conditions apply. For details see rentsmart.ht.com.au.

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- **WRT300N** Wireless-N Broadband Router



**Wireless-N Home Router
WRT150N**

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HOUSE**

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PER CARTRIDGE



Epson offers individual ink cartridges across its range of A4 inkjet printers. And from \$8.99* per cartridge, the value doesn't stop there. So why buy a printer that uses a multicolour cartridge when with Epson you only need to replace the colour you use.

Visit www.ink.epson.com.au for more information.

*RRP including gst. #Printer and cartridges for illustrative purposes only.

